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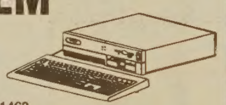

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fax/modem • **Preinstalled software:** MS DOS
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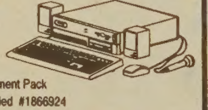

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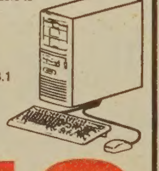

486DX2-50MHz CPU • 270MB Hard Drive • 4MB RAM expandable to
56MB • Dual Floppy Drive • Local BUS video graphics
5 ISA expansion slots • 5 drive bays • Intergrated fax/modem
Supports Intel OverDrive processor(486DX2/66), as well as
future OverDrive processor with Pentium technology
• **Preinstalled software:** MS DOS • TabWorks • MS Windows 3.1
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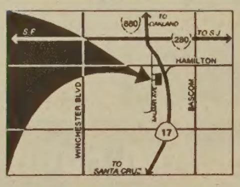

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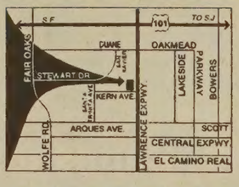

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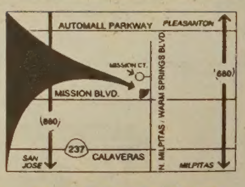

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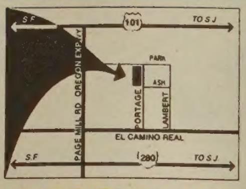

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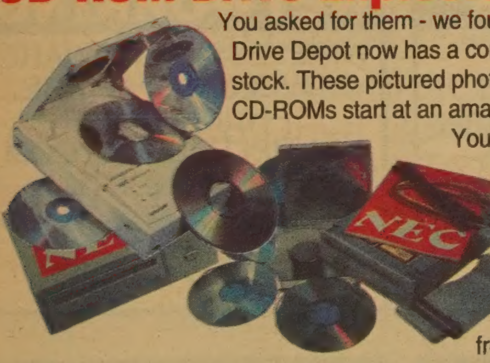

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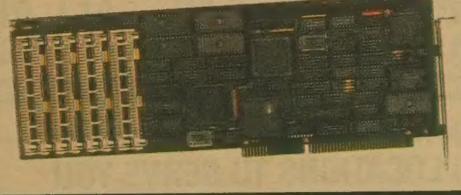

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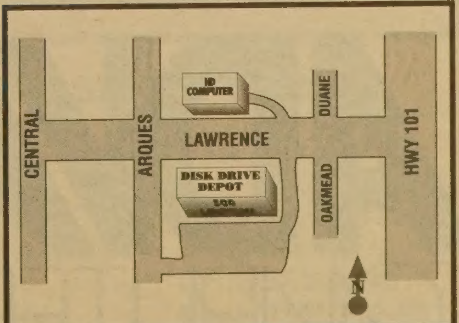

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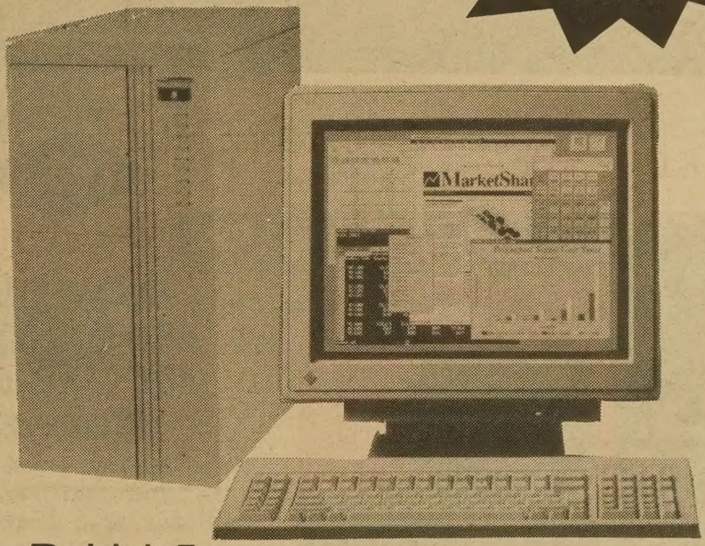

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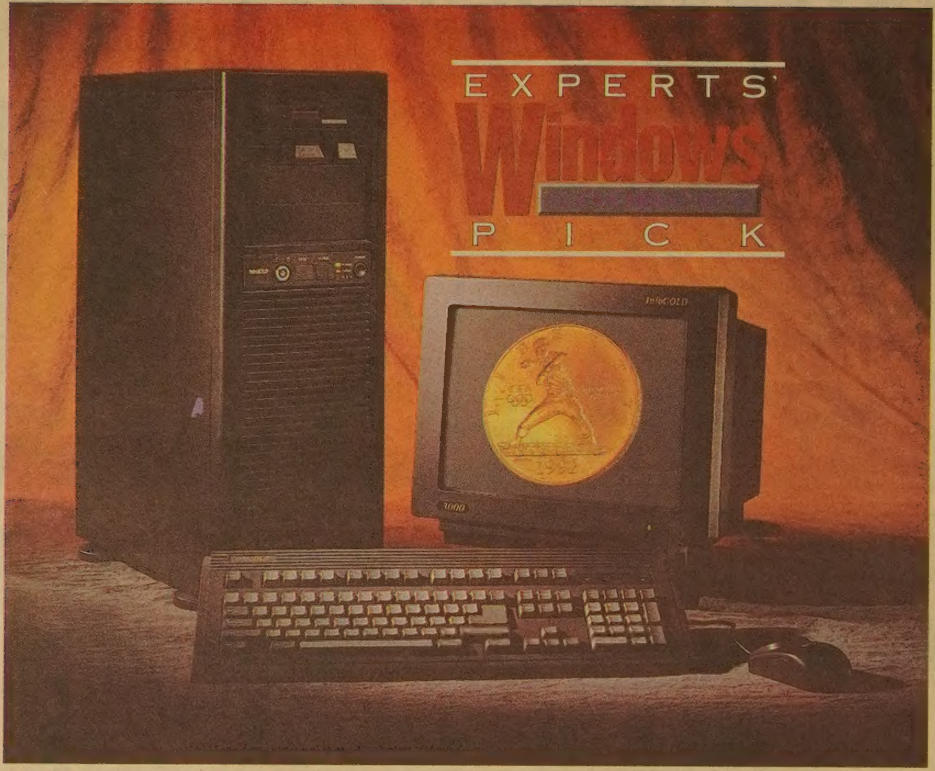

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A NOTE FROM THE EDITORS

Both "multimedia" and "Internet" have become household words in the last year, and this issue brings a variety of perspectives on both.

In our cover story, we look at how the Exploratorium, a pioneer in interactive science museum exhibits in the analog world, is moving into the digital age.

We're also proud to feature a chapter from a new book by our own UNIX columnist Bennett Falk, called *The Internet Roadmap*. Bennett offers tips on accessing a world of information with gopher.

And, of course, in our MultiMedia & beyond section, our writers bring you information about the latest products and technologies.

—ME

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Learning Through Experience

BY MICHAEL ROBIN 96

COVER PHOTO: SUSANA MILLMAN

In this interview, Technical Curator Larry Shaw explains how San Francisco's world-renowned science museum is turning to the Internet and multimedia to make its exhibits more accessible.

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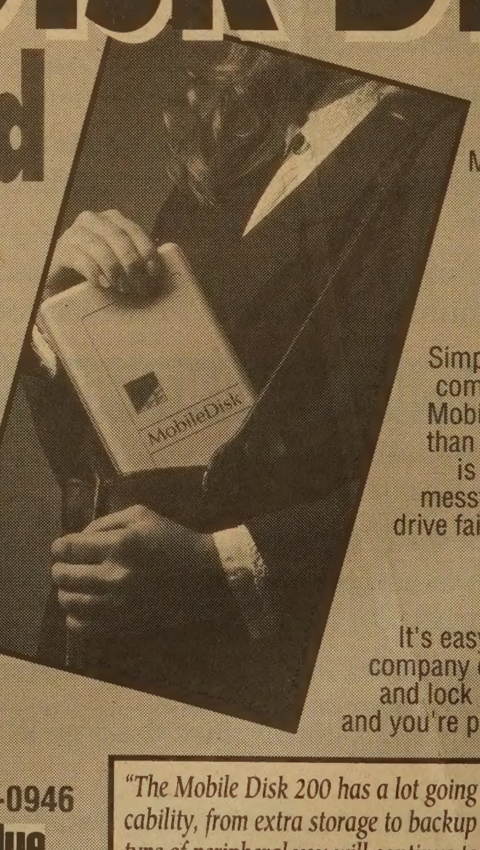

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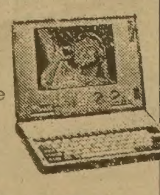

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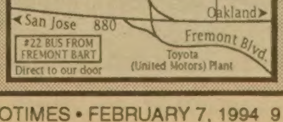

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AMD	
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514400-70 (4x1) SOJ	17

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4-12 MB Exp Brd	239
DeskPro 386s-16	
1 MB Module	89
4 MB Module	179
1-9 MB Exp Brd	159
4-12 MB Exp Brd	240
DeskPro 286N, 386N, 386SX/20	
2 MB Module	75
4 MB Module	175
DeskPro 386N, 386SX/20	
2 MB Module	118
DeskPro 286N, 386N	
0-4 MB Exp Board	175
DeskPro 386/33SL, 486/25, 486/33L System Pro	
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8 MB Module	239
32 MB Module	1700
DeskPro 386/16	
1 MB Kit	89
1 MB Exp Brd	229
2 MB Exp Brd	329
4 MB Kit.	CALL
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8 MB Exp Brd	725
Portable 386	
1 MB Kit.	125
4 MB Exp Brd	310
4 MB Exp Brd	322
Portable LTE (8086)	
512K Module	CALL
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2 MB Module	189
4 MB Module	425
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4 MB Module	349
Portable SLT/386	
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4 MB Module	225
Portable III	
512K Kit.	55
2 MB Kit.	125

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2 MB Kit	99
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1 MB Module	69
Mdls 70-061: E61: 121: 50Z, 55LS, 55SX: 65SX: P70:	
2 MB Module	99
Mdls 70-A21: A61, B21, B61	
2 MB Module	99
Mdls 55SX: 65SX: 55LS, 65LS	
4 MB Module	159
Mdls 80-111; 121, 311, 321	
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Mdls 80-A21; A31	
4 MB Card	215
Mdls 80-A21: A31	
4 MB Card	215
Mdls 90; 95	
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4 MB Module	259
Mdls 50 & 60	
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2 MB	12125-001	129
4 MB	121125-002	225
Contura Lite 20/25		
2 MB	129769-001	125
4 MB	129769-002	245
8 MB	129769-003	395
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4 MB	107653-001	310
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EBD	167811-001	225
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4 MB	112534-001	189
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6 Socket E Board		CALL
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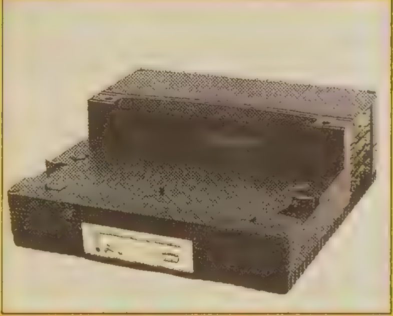

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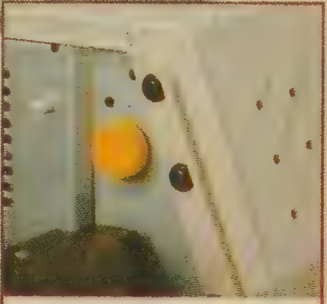

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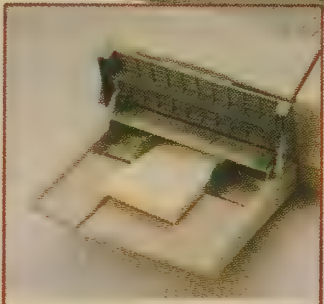

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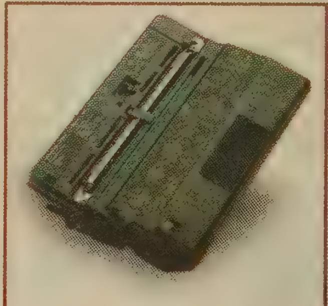

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Patent Office Reviews Compton Multimedia Patent; Microsoft Shows New Windows; Apple Announces eWorld

BY PAUL HOFFMAN

The US Patent and Trademark Office has decided to reexamine Compton's New Media's controversial patent, even before any formal challenge was filed.

MANY SOFTWARE DEVELOPERS THINK THAT THE MARKET FOR NT SOFTWARE WILL BE MINUSCULE IN COMPARISON TO THE PRESS IT RECEIVED, POSSIBLY SMALLER THAN THE UNIX-ON-PCS MARKET. BUT THE NEXT BIG THING FOR THE PC, WINDOWS 4, IS ALSO ON ITS WAY TO BEING AN OVERHYPED SENSATION.

Copyright © 1994 by Paul Hoffman. All rights reserved. *Paul Hoffman is an industry analyst who has been covering microcomputer technology for fifteen years. He also writes popular computer books and is the president of Proper Publishing. He can be reached at phoffman @netcom.com.*

The patent, issued in August but only widely disclosed in November, was roundly criticized as incorrectly issued because the technology covered in the patent was obvious. The Patent Office's move to reexamine the patent before anyone else challenged it is very rare, leading many lawyers to believe that the Office wanted to avoid more bad publicity. The move means that Compton's will not try to get royalties on the patent until the matter is resolved.

The review does not mean that the patent is dead, however; nor does it preclude other companies from challenging the patent if the Patent Office reissues it. Anyone can challenge the patent at any time by showing new evidence of "prior art." The Patent Office's move simply removes Compton's threat to other companies temporarily, and takes some of the heat off of the Patent Office. Coincidental with the debate over the Compton's patent, the Patent Office has started public hearings on software patents to reexamine their scope and necessity in the current marketplace.

WINDOWS 4 NEWS

There is absolutely no doubt that Windows 3.1 is the most important operating system on PCs, but many companies are starting to wonder what the future might hold.

Due to many factors, Windows NT has not sold nearly as well as many predicted a year ago, and it has already fallen from the limelight. Many software developers think that the market for NT software will be minuscule in comparison to the press it received, possibly smaller than the UNIX-on-PCs market. But the next big thing for the PC, Windows 4, is also on its way to being an overhyped sensation.

Windows 4 will have a revised user interface, resembling a menage of Windows 3, the Macintosh, and OS/2. The new features will help make launching more than one program at a time more intuitive. It will also contain OLE 2, Microsoft's structure for letting programs and documents communicate easily. Windows 4 will run 32-bit programs, which will supposedly make it faster. The new version will only run on 386-and-above systems that have at least 4MB of RAM and lots of free hard disk space.

Microsoft demonstrated a very early revision of the Windows 4 software to five thousand developers last month in order to get them excited about converting all their programs to the new system. They also distributed the first development kits for the new version so that the developers who wanted a long lead time could get started. (Windows 4 had previously been called "Chicago," but using the code name for the product when it is so widely discussed is fairly silly.) The meeting did indeed get many companies interested, but also raised many red flags for others.

Like most commercial software, Windows 4 is taking longer to develop than was originally thought. In fact, the release date has already been pushed back twice, and Microsoft was very careful not to commit to the current date, which is officially November of this year. The first release of the developers' kit will only allow vendors to start converting their software; later releases will allow real development.

Of more concern to many developers is the fact that Windows 4 is not really a 32-bit operating system. Microsoft has admitted that much of the internals of Windows 4 will be old 16-bit code, meaning that those portions will probably not run any faster than Windows 3.1, and may in fact be slower because all the data going into those portions will be twice as large as it needs to be. It is not clear yet exactly which portions of Windows 4 will use old 16-bit technology, but if most of the graphics section uses the old code, many users may find no speed increase in Windows 4.

This worries many software developers because, although tens of millions will upgrade to v4 no matter what, other tens of millions might not if the new version turns out to be buggy, late, and/or slow. The expected mass migration to Windows NT that never materialized has spooked many developers, but they know that they can't wait until after Windows 4 is released to start their conversion.

Because the main thrust of the conversion is from 16-bit data to 32-bit data, it will be almost impossible for most developers to use a single copy of their program's source code to create versions for both Windows 3.1 and Windows 4. To make matters worse, Microsoft is still putting a lot into Windows NT, and that market may grow just enough to make it important a year from now when Windows 4 is released.

The next few months may well be difficult for many Windows software companies as they try to decide what to do next. Do they put all their programming resources into new Windows 3.1 technologies like OLE 2, multimedia, and cross-platform systems? Do they allocate their resources towards Windows 4, possibly losing some Windows 3.1 sales in the meantime? Do they start looking at the new Apple/IBM PowerPC systems that are getting a great deal of attention in the media? Do they trust Microsoft's sales projections, even though they have been overly optimistic in the past?

Many will make wrong guesses, and only the largest companies will be able to put enough people on all the different projects without skipping over the next big operating system.

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CONNECTING IN 1994: TOO MANY CHOICES?

When it makes the cover of *US News and World Report* and shows up in *Time*, the *Wall Street Journal*, and on the morning news shows, you know that it's the next big thing ready to be misinterpreted. In 1992 and early 1993, bulletin board systems (BBSes) got a great deal of unwanted publicity from tabloid news shows and newspapers who portrayed them as nothing other than pornography mongers. With the backing of Vice President Al Gore, the Internet took most of that limelight away, and a host of magazines has now portrayed the Internet, also known as the National Information Infrastructure and the "data superhighway," as the thing to be talked about in 1994.

To some in the industry, this is a blessing; others worry that this coverage is similar to the way home computers were covered in the same magazines ten years ago as great places to store your recipes and make home budgets.

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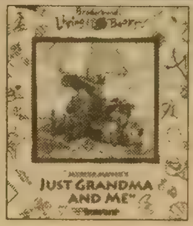

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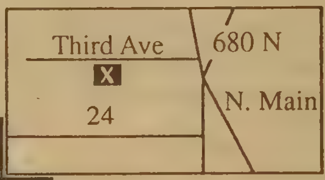

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At the same time as the hype about the Internet gets hot and heavy, the major media companies are starting to make noises about connecting homes through the cable TV system instead of the phone system. The phone companies want to start providing data services, and new players are showing up in the current online arena all the time. It is clear that the future of personal and business networks will not be monolithic, but will instead resemble today's television choices with a few giant (but not really dominant) services, many mid-range conglomerates, and lots of small-to-tiny niche services.

Apple recently announced eWorld, its new online service that will appeal to almost every Apple customer. eWorld will not be available for a few months, and will be available to people using Macintoshes, PCs, and Newtons. In fact, once the software is stabilized, it will come installed on most future Apple computers. Apple hopes to leverage its name to make the service attractive. It will have an uphill battle against America Online, however, because eWorld will be quite expensive ($9 a month for the first two hours, plus $5 per hour after that for evening and weekend use). Other major manufacturers like Microsoft and Novell are looking at starting their own similar systems.

THIS YEAR, MANY PEOPLE ARE LOOKING UP TO THE BIG COMPANIES TO DEFINE THE ONLINE NETWORKING WORLD, BUT THE FUTURE LOOKS EVEN BRIGHTER FOR THE SMALL AND THE LOCAL FIRMS THAT ARE MORE CUSTOMER-ORIENTED.

The major news media are busy covering other potential players in the online services field, the cable companies and the telephone companies. These behemoths are seen as having deep pockets and are therefore threatening to the entrenched leaders like Prodigy, America Online, and CompuServe. Most of these stories ignore the fact that when you think of friendly, modern, and inexpensive service, you rarely think of your cable or telephone company. Although the content is important, and many media giants have the video content, service in this type of industry is even more important, and companies like TCI and Pacific Bell get consistently low ratings on service and support.

Instead, many people will choose to connect to a different source altogether: a local BBS. The BBS industry is experiencing a continued growth rate that matches that of the more traditional online providers, and the quality of information and interface on BBSes is growing at the same rate. Some people prefer WalMarts for size and convenience; others prefer the local grocer. In the same way, many people will get fed up with the national (and international) scope of the large online services or the Internet and look for a local alternative, and will most likely find it in a BBS. Last year, many BBSes began adding big-ticket features like Internet email gateways and graphical user interfaces; by the time the media giants know what they want to do, BBSes will be a real alternative in almost every respect. It costs less than $4000 to start a real BBS system, compared to the tens of millions of dollars that Apple is paying to start eWorld.

The Internet may also prove to be the best of both worlds, providing big access with the possibility of a local feel. Small Internet providers can easily create Usenet news groups for just their system, and can also align with other local providers to make local news groups and mailing lists. Technically, there is no difference between a UNIX system running as an Internet host and a BBS, and creative providers will offer mid-level services to individual users and local businesses.

Ten years ago, the computer industry assumed that size was everything. Apple couldn't compete with a nonstandard computer, and small Asian companies would never get anywhere in the PC world. Both these assumptions were proven wrong. This year, many people are looking up to the big companies to define the online networking world, but the future looks even brighter for the small and the local firms that are more customer-oriented. ■

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MICROTIMES STOCK INDEX CLIMBS TO ANOTHER RECORD HIGH

During the trading stanza ended January 7, the MicroTimes Stock Index rose once again into record territory. Specifically, the MicroTimes Stock Index added 222.25 points, or 4.79%, to close at 4866.50—its first jaunt over the 4800 mark. Advancing issues overpowered declining issues by a 25 to 6 count with seven stocks reaching new 52-week highs.

The Dow Jones Industrial Average tried to keep pace with the MicroTimes Stock Index but rose only 69.2 points, or 1.84%, before reaching a closing mark of 3820.77. The S&P 500 also carved out gains to the tune of 3.52 points, before closing at 469.90.

Turning to MicroTimes stocks of interest:

•Adobe Systems Inc. was embraced by investors during the period, as that stock upticked $5.00, or 23.53%, before finally coming to a closing price of $26.25. Adobe took the largest percentage gained honor for the period. In a recent news release, Adobe announced fourth-quarter net income per share increased to 34 cents from 18 cents recorded one year earlier. The results were above and beyond forecasts of 28 cents a share. Separately, Adobe also announced that it will buy back two million shares, or about 4.4% of its outstanding shares.

•Intel was another gainer in the accompanying chart, as that stock increased $7.88, or 13.58%, and closed at $65.88. Intel was recently repeated as a "buy" by analyst Krishna Shankar at Salomon Brothers. Intel earned an estimated $1.35 per share in the fourth quarter compared to 99 cents per share recorded one year earlier. The actual results should be available by January 18.

•Apple Computer Inc. announced plans with Microsoft Corp. to develop ways that software can work together. The new communications software will run on Microsoft's Windows operating system. Macintosh now runs on a proprietary operating system, but the new software will allow Macintoshes to communicate in networks with PC compatibles.

In other news, Apple was downgraded by analyst James Poyner at Oppenheimer & Co. to "underperformer" from "market performer." Apple added $3.63, or 12.29%, before reaching a closing price of $33.13.

•Pacific Telesis was put in the sell column, as investors shed their shares to the tune of $2.13 per share. Pacific Telesis announced after-tax charges to fourth-quarter earnings of $576 million for reserves to reduce its work force and "system reengineering." The company will also take a $496 million after-tax charge for FAS 106 and 112 obligations. According to Standard & Poor's, the charges should not affect the company. Pacific Telesis closed at $54.25. ■

EXCH	COMPANY		TICKER SYMBOL	CLOSING PRICE 12/17/93	CLOSING PRICE 01/07/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE											
OTC	Adobe		ADBE	21.25	26.25	5.00	23.53	21	0.20	0.76	37.00	16.25
OTC	Aldus	(H)	ALDC	23.75	25.50	1.75	7.37	50	0.00	0.00	27.50	13.25
OTC	Autodesk		ACAD	44.50	45.88	1.38	3.09	20	0.48	1.05	56.75	37.00
OTC	Borland		BORL	15.38	15.00	–0.38	–2.44	–	0.00	0.00	27.25	12.75
OTC	Informix		IFMX	18.75	19.00	0.25	1.33	24	0.00	0.00	27.25	13.38
OTC	Lotus	(H)	LOTS	56.38	59.25	2.88	5.10	63	0.00	0.00	59.25	19.00
OTC	Microsoft		MSFT	80.50	85.25	4.75	5.90	26	0.00	0.00	98.00	70.38
OTC	Novell		NOVL	20.13	21.75	1.63	8.07	–	0.00	0.00	35.25	17.00
OTC	Oracle		ORCL	34.88	31.75	–3.13	–8.96	47	0.00	0.00	37.75	13.31
OTC	Software Publishing		SPCO	7.50	8.00	0.50	6.67	–	0.00	0.00	14.50	5.50
OTC	Symantec		SYMC	15.63	15.88	0.25	1.60	–	0.00	0.00	20.50	9.25
	HARDWARE											
OTC	Apple		AAPL	29.50	33.13	3.63	12.29	52	0.48	1.45	65.25	22.00
OTC	AST Research		ASTA	23.25	23.63	0.38	1.61	–	0.00	0.00	25.50	12.75
NYS	Commodore		CBU	3.38	3.75	0.38	11.11	–	0.00	0.00	7.63	2.50
NYS	Compaq	(H)	CPQ	74.25	77.75	3.50	4.71	16	0.00	0.00	77.88	41.75
NYS	Digital Equipment		DEC	35.38	36.38	1.00	2.83	–	0.00	0.00	49.25	34.13
OTC	Dell		DELL	23.88	25.75	1.88	7.85	–	0.00	0.00	49.88	13.50
NYS	Hewlett-Packard		HWP	77.88	83.00	5.13	6.58	18	1.00	1.20	89.25	64.38
NYS	IBM	(H)	IBM	59.75	58.88	–0.88	–1.46	–	1.00	1.70	60.00	40.63
NYS	Silicon Graphics	(H)	SGI	22.75	23.88	1.13	4.95	35	0.00	0.00	24.75	11.75
OTC	Sun Microsystems		SUNW	27.13	29.63	2.50	9.22	18	0.00	0.00	41.00	21.13
NYS	Xerox	(H)	XRX	88.63	90.75	2.13	2.40	–	3.00	3.31	91.00	69.88
NYS	Tandy	(H)	TAN	48.38	46.63	–1.75	–3.62	31	0.60	1.29	50.75	24.63
	CPU'S											
NYS	Advanced Micro Devices		AMD	17.88	18.38	0.50	2.80	7	0.00	0.00	32.88	17.00
OTC	Intel		INTC	58.00	65.88	7.88	13.58	14	0.20	0.30	74.50	42.75
NYS	LSI Logic		LSI	14.13	16.63	2.50	17.70	18	0.00	0.00	19.25	10.25
NYS	Motorola		MOT	87.50	89.63	2.13	2.43	29	0.44	0.49	107.50	48.75
	COMMUNICATIONS											
NYS	AT&T		T	54.63	54.63	0.00	0.00	18	1.32	2.42	65.00	50.75
NYS	BellSouth Corp.		BLS	57.63	55.50	–2.13	–3.69	17	2.76	4.97	63.88	50.63
OTC	MCI		MCIC	26.50	27.38	0.88	3.30	22	0.04	0.15	29.88	18.81
NYS	Northern Telecom		NT	29.38	32.63	3.25	11.06	–	0.36	1.10	46.00	21.38
NYS	Pacific Telesis		PAC	56.38	54.25	–2.13	–3.77	25	2.16	3.98	59.25	43.25

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES....................	25
DECLINES.....................	6
UNCHANGED................	1
NEW HIGHS..................	7
NEW LOWS...................	0

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER.........................	Intel...	$	7.88
LARGEST DOLLAR LOSER.........................	Oracle..	$	–3.13
LARGEST PERCENTAGE GAINER...............	Adobe..		23.53 %
LARGEST PERCENTAGE LOSER................	Oracle..		–8.96 %

	CLOSE 12/17/93	CLOSE 01/07/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD
MICROTIMES STOCK INDEX	4644.25	4866.50	222.25	4.79
DOW JONES INDUSTRIAL AVERAGE	3751.57	3820.77	69.20	1.84
STANDARD & POOR'S 500 INDEX	466.38	469.90	3.52	0.75
N.Y.S.E. COMPOSITE	257.79	260.34	2.55	0.99
NASDAQ COMPOSITE	759.23	782.94	23.71	3.12

CLOSING QUOTES FOR GRAPH:		
DATE	MICRO TIMES	DOW JONES
05/27/93	4554.50	3554.83
06/24/93	4266.52	3490.61
07/22/93	4072.42	3525.22
08/23/93	4264.70	3605.98
09/17/93	4212.67	3613.25
10/18/93	4473.13	3642.31
12/17/93	4644.25	3751.57
01/07/94	4866.50	3820.77

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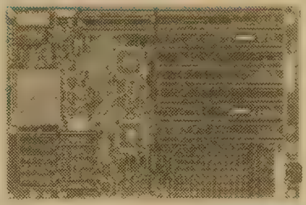

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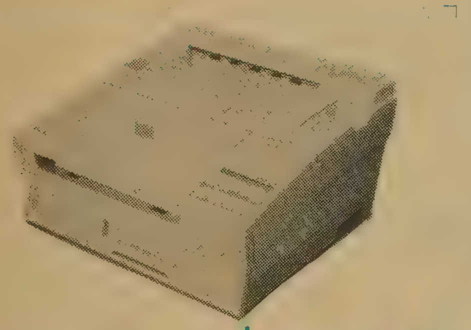

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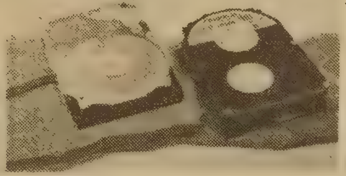

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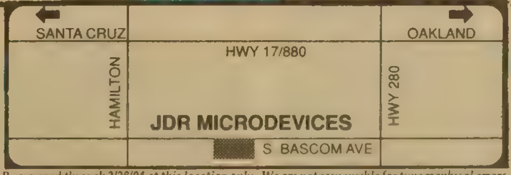

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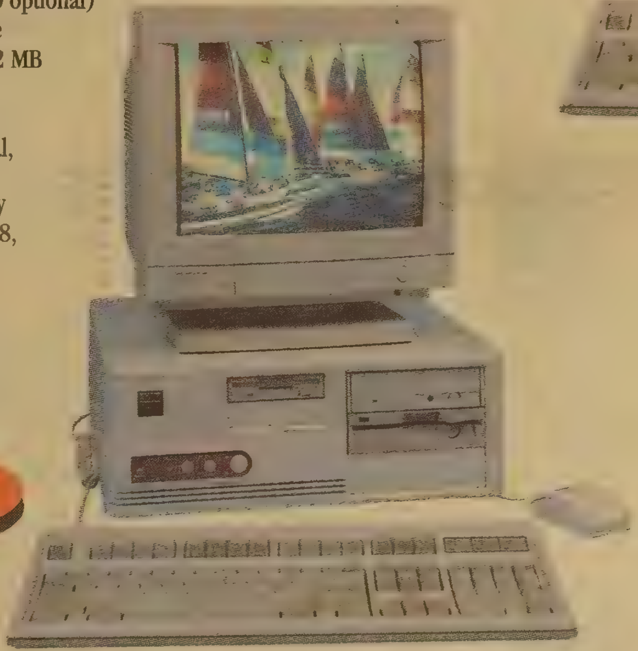

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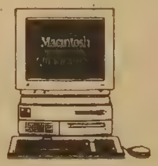

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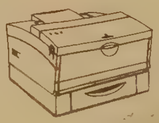

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REALIZABLE FANTASIES

These columns concern the future—fantasies that are rapidly being realized through the efforts of us all.

COMPUTER-AIDED VOTERS

Last month's column outlined how political disclosures can be computerized and made publicly available—state and local campaign-finance reports, state and local statements of officials' personal economic interests, and state lobbyists' disclosures. These can all be computerized at almost no cost to anyone—at least not beyond what it already costs those who are required to submit pre-landfill disclosures (paper).

Just about anyone with a computer and a modem can have access almost immediately, from almost anywhere, usually for free. California has about fifteen million computer users; 850,000 to 1.5 million of them already have Internet access. Many tens of thousands of others use about fifteen hundred FidoNet BBSes around the state (bulletin board systems), as well as thousands of other networked BBSes.

In California, there are currently more than nineteen thousand state and local filers—candidates, campaign committees, major donors, senior elected and appointed officials, large and not-so-large lobbyists (including numerous under-funded good-government and public-interest lobbyists), and so on.

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There are about twenty to thirty thousand state-level filings per year, each ranging from a few pages to several thousand pages—though each page contains relatively little information. It appears that even the largest state filing (e.g. for a gubernatorial candidate) can easily fit on a single floppy diskette (probably even without using data compression). All of the information disclosed in all of California's state filings can trivially fit onto a 3 to 5GB hard disk (about $5000?), even if *all* of them were stored in wildly oversized fixed-length ASCII records without compression.

Note: State filings do *not* include most local political disclosures. Those are filed with, and made available to the public by, cities, towns, counties, school districts, and the other local agencies—but the information filed in a local jurisdiction totals *much* less than the massive state filings (except for San Francisco and Los Angeles, which are required to receive and provide access to *both* their own jurisdiction's filings and all of the state-level filings).

IMPLEMENTATION PLAN FOR DIGITAL DISCLOSURES

The day after New Year's, I forwarded a 28-page implementation proposal to about thirty legislators and other officials who had requested it or had otherwise expressed interest in low-cost computerized disclosures. Titled "Computerized Political Disclosures: Doing It With Minimal Cost and Maximum Utility," it is modeled largely after my May 1993 proposal for implementing Assembly Bill 1624 (Bowen-D). AB1624 mandated free statewide and global online public access to comprehensive state legislative information—now enacted as Cal. Gov. Code 10248 and implemented essentially as I proposed (though costing perhaps five times my $10,000 estimate). Note: These proposals are generic in nature; I have no business or financial interest in their adoption.

If recipients like the new political-disclosures proposal, Sen. Tom Hayden (916/445-1353) may amend his SB758 (Senate Bill) based on the proposal. Assembly Member Jackie Speier (916/445-8020) may introduce legislation further extending the mandate for computerized disclosures to include lobbyists (covered in my proposal at Speier's request).

By the time this is in print, the Commission on the Future of the California Courts should have released its comprehensive recommendations for totally revamping the state and local court system.

On January 3, within hours of my faxing an Executive Summary of the proposal to a number of legislators and officials, including Chief Deputy Secretary of State Tony Miller (916/445-6371), he faxed back a copy of his letter of the same date, in which he asked the leading candidates-to-be for Governor (Wilson, Brown, Garamendi) to voluntarily file their forthcoming campaign disclosures in computerized form, as well as the currently required paper form.

Fuel freedom's fire! Send *your* matching request to the candidates.

This *is* the nation's leading high-tech state, at the end of the twentieth century. Isn't it time the body politic had *modern* access to crucial decision-making information?

For connected readers, electronic copies of the implementation proposal—named "polidisclos.r3"—are available by anonymous ftp (Internet file transfer protocol) from cpsr.org in /cpsr/states/california /polidisclos, or on the WELL in /home/j/w/jwarren, in Mac Word 5 and RTF formats. For a wasteful paper copy, send a self-addressed, $2.13-stamped, 9"x12" envelope to me at 345 Swett Rd., Woodside, CA 94062.

Be the first on your block to furnish copies to your county clerk, voter registrar and board of supervisors, and your city clerk and council.

FIRST, THE LEGISLATURE; NOW, ALL OF OUR GOVERNMENT

Assembly Member Tom Bates (Oakland-Berkeley area, 916/445-7554) introduced legislation on January 3 that would mandate comprehensive public access to already-computerized public records via the computer nets.

Assembly Member Debra Bowen (Torrance area, 916/445-8528)—sponsor of AB1624—is reportedly planning to introduce legislation to further mandate "electronic access to government" (no details as of press deadline).

The Association of Bay Area Governments (ABAG) is actively investigating how it might serve it's members—one hundred cities and nine counties—that are increasingly interested in setting up or otherwise facilitating "civic nets." These are local public computer networks that provide 24-hour-a-day, 7-days-a-week access-from-anywhere to local government information, agendas, minutes, policies, procedures, permit applications, community-issues discussions, school information, library resources, etc.

By the time this is in print, the Commission on the Future of the California Courts should have released its comprehensive recommendations for totally revamping the state and local court system—a proposal that reportedly includes *extensive* recommendations for a "paperless judiciary." The cyber-court proposals reportedly came from a Technology Committee within the Commission, headed by Associate Justice George Nicholson (3rd District Court of Appeals, Sacramento). Who knows—maybe someday, even people without high-priced lawyers might be able to obtain something akin to equal access to the court system. (They aren't calling it "cyber-court;" I'm calling it that.)

> *It appears that even the largest state filing (e.g. for a gubernatorial candidate) can easily fit on a single floppy diskette (probably even without using data compression).*

And an open-government advocate in the Texas Legislature—State Representative Glen Maxey (Austin)—has just heard about AB1624 and wants to do the same thing in Texas.

THE HORSE'S MOUTH

I'll be speaking about "Modern (Electronic) Access to Government" before the Commonwealth Club in San Francisco, May 5 at 5 pm (415/597-6700).

I'll also discuss "Realworld Civic Networking" at a meeting of the IEEE Society on the Social Implications of Technology, Silicon Valley Chapter, February 10 at 7:30 pm (415/948-9275 or dpaull@infoserv.com). ■

Jim Warren founded InfoWorld, Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's, Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992), and led the recent successful effort to make state legislation and statutes available via the public nets without state charge. He is also a member of Autodesk's board of directors.

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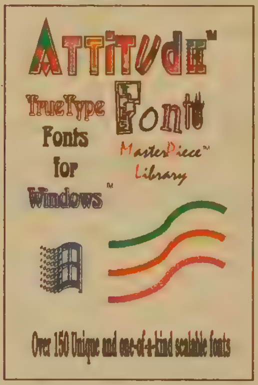
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Letters

PHOOEY ON FORBES

I stumbled on Rich Karlgaard's article "NAFTA's Strange Bedfellows: It's Only the Beginning" as I raced through your January issue. Why wasn't there a notice saying "paid political advertisement" near it? Such poor rhetoric has little place in a magazine that should aspire to help others reason well in assessing their place in the chaos generated by current technological developments.

Poor simplistic dichotomies like "authoritarian/libertarian" (isn't anarchy the opposite of authority? don't most Libertarians, as a party, believe in the institution of government?) don't elucidate the darker side of political wheeling and dealing. It could be argued that Mr. Karlgaard intends to reach out to members of the liberal, college-educated baby boomers and pull them towards *Forbes* magazine by arguing that they are libertarians like *Forbes* magazine, not democrats, socialists, etc. Placing Jerry Brown in a different category than organized labor would certainly be news to him, and regarding Ronald Reagan as a libertarian when he supported tyranny in El Salvador and resisted the breakup of the giant AT&T monopoly seems ludicrous. Reagan was a right-wing authoritarian, who did what he could to undermine the Freedom of Information Act in his eight years in office.

Karlgaard's use of percentages is misleading when applied to Moore's Law. Moore's Law would require the software being used and its application to be constant in order to have relevance. When 90% of the world's users are doing word processing, doesn't that skew the statistic? Large corporations almost never used their computers for writing letters, publishing annual reports, etc., in the 1970s; they had larger fish to fry and more customized software to help them do it. Democratization of part of the means does not mean democratization of the ends.

Alvin Toffler mentioned a few of the information tactics that are currently being exploited that use information as a weapon to be manipulated and used against its recipients. He also mentions how people with an agenda weight different variables to skew the results.

Let's commit ourselves to clear-headed problem solving and doing our utmost to maintain an unbiased discussion of the information age and its technology.

Ian Webster
San Francisco

To address Mr. Webster's last point first, we believe the notions of non-agenda-driven information and unbiased discussion are simply oxymoronic. The Tofflers' larger point is that all communication is agenda-driven, consciously or otherwise; all humans are inescapably prisoners of the deliberate or unconscious editorial decisions and goals of all the other humans who produce and process information. Political advisors skew the information they present to officials; columnists and academics play up the facts that support their theses and downplay those that don't; scientific research results proceed inevitably from the project's design; and so on. We are all constrained by the filters of our own experience and the unknown filters through which information comes to us.

The only fix for this, as the Tofflers also noted, is to get more information, from sources as diverse as you can manage. To the extent that this magazine has aspirations and philosophical commitments, that's what we're trying to do. We're not in the One True Path business; we're in the business of letting a wide range of people present their experiences and letting the readers decide for themselves the relevance and accuracy of this information in their own lives, from OS wars to legislative wars.

We do tend to agree with Karlgaard (to say nothing of our friends at the Hackers Conference) that the personal computer was born of a fundamentally anti-authoritarian impulse and that it has had an incalculable effect in allowing individuals to evade monolithic structures and live and work in ways they find personally fulfilling. While Mr. Webster is quite correct in asserting that this effect is still far from universal, it would take an act of willful perversity to ignore all the barriers the personal computer has broken and, in accordance with Karlgaard's thesis and Moore's Law, will go right on breaking.

As the next letter illustrates, though, we're clearly not there yet.

For another perspective on Karlgaard's editorial, see Mitch Kapor's article on page 32.

—ME

WHAT ABOUT THE REST OF US?

Through various temporary and volunteer jobs, I have had my nose rubbed in computers, both PCs and Macs. What I do is strictly "monkey see, monkey do," and I have only a glimmer of how to use them and their software properly.

I read your publication in hopes of being enlightened, but I don't know any more than when I started. You are truly preaching to the converted. Can't you spare at least one column for us Great Unwashed, who regularly deal with computers in abysmal ignorance?

We can't waste time fooling around with games and virtual reality; our everyday reality is quite enough to deal with! Good old Sears sells computers these days right there with washers and refrigerators, but we peasants only feel secure in shopping for the latter which we know are useful to us.

Think of the market that would open up if we weren't computer-ignorant! Free publications like yours have an educational duty.

Catherine Borka
Santa Cruz

Ms. Borka's letter raises a lot of provocative points and certainly illustrates the fact that while the personal computer has been a godsend to lots of folks, computers in general remain pretty alien and scary to large portions of the population.

"We peasants only feel secure in shopping for [things] we know are useful to us," she says. Well, it may be heresy, but there are a whole lot of people out there who don't need a computer and never will, and "peasantry" doesn't have a thing to do with it. Many of them will realize the benefits of the Information Age through TV-like rather than computer-like devices, to great and far-reaching effect.

And this, we think, is fine. We don't think anybody should go out and buy a computer without having some idea of what they want to use it for. Until it's a necessary component of something you want to do, you don't need one, all the hype in the universe notwithstanding.

That said, all of us were beginners once. Bill Gates was a beginner once. And there are a lot of beginners and potential beginners out there in search of ideas for how to use their computers more effectively, and why a computer might be useful in the first place.

Once or twice in the last few years we've had a series of beginner-oriented columns, and we're certainly open to the notion of doing it again. In order to make such a column useful, since the choices have become a good deal more complex since then, we'd like to explicitly invite feedback from our readers as to what they'd like to see in it.

Please let us hear from you.

—ME

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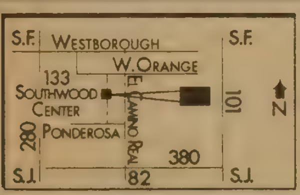

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From The Frontier

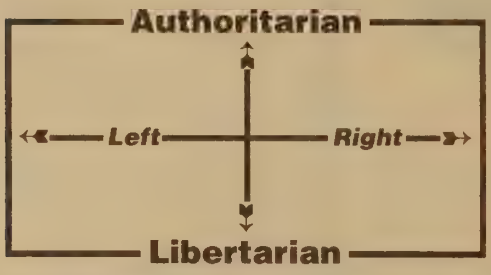
Anti-Authoritarians On The Info Highway

BY MITCHELL KAPOR

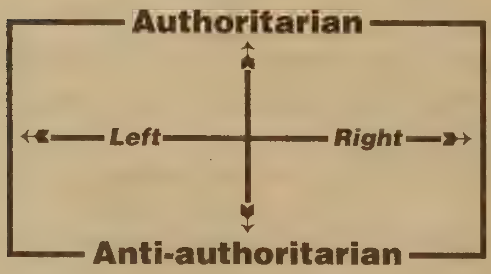
Rich Karlgaard wisely observes ("NAFTA's Strange Bedfellows," Issue #118): *...the range of political opinion in the US is not always spread along a single axis of left to right. I believe there is another axis ascendant: authoritarian/libertarian. Try this exercise. Draw a left-to-right line across a page. Then draw a vertical line from top to bottom, labeling it Authoritarian on top, Libertarian on bottom. You have just created a grid with four quadrants.*

I have tried to illustrate his point.

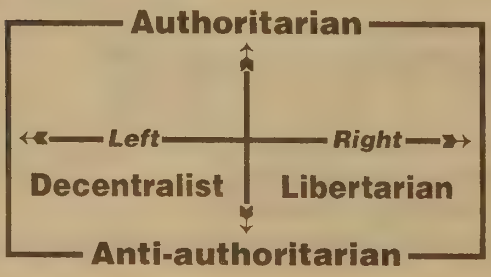
Karlgaard's two axes:



I want to substitute "anti-authoritarian" for "libertarian," as follows:



Doing this permits distinguishing two varieties of anti-authoritarian, the decentralist and the libertarian.



As Rich indicates, on some issues, like NAFTA (and, I might add, the Clipper Chip), the opposing sides are divided, not on liberal-conservative political lines, but on the horizontal axis.

I would claim that the lower half of the political space should simply be called anti-authoritarian, and that it is divided into two quadrants: on the left, the decentralist, and on the right, the libertarian.

You can see how this works on Clipper chip and other privacy issues related to encryption. EFF chairs a coalition of sixty organizations, from the American Petroleum Institute to the ACLU, which opposes government control of encryption. You have cypherpunks and corporate interests aligned on this issue, because they all want decentralization of control over encryption technology.

On issues where the goal is to remove government-imposed barriers, like privacy, there is easy agreement between left-leaning decentralists and right-leaning libertarians. The coherence of EFF's Board resides in the libertarian-decentralist commonality of interest which is more important than conventional divisions of left-right politics.

INFRASTRUCTURE ISSUES

On the other hand, the sometimes fractious nature of the public interest community, of which EFF is part, can be seen in splits along the same horizontal axis. EFF supports private sector ownership and operation of the National Information Infrastructure. Many other public interest organizations share the same general goals of openness for the NII as EFF, but prefer approaches lying above the horizontal midline, e.g., through direct government ownership or operation of the NII.

Infrastructure is a trickier issue than privacy. All anti-authoritarians would agree that a government-built NII is the wrong approach. However, there seems to be more willingness among many on the net who think of themselves as libertarians to leave it entirely to private industry to build the NII, where government abandons any role, even as referee. If we wound up with an NII controlled by an oligopoly of enormous corporate interests which resulted in centralized control over content, it would be a bad thing. If independent content providers can't easily get on the network, it would be a huge catastrophe.

It seems to me that, in principle, corporate authoritarianism is as dangerous as government authoritarianism, and this is an issue which may separate left-quadrant and right-quadrant anti-authoritarians.

A libertarian would argue that if government got out of the way, e.g., deregulated telecommunications and let everybody compete, that would be sufficient to achieve the right kind of NII. Personally, I think that's naive. A more considered libertarian view would be that either the market will produce the desired result by itself or it won't, but there is nothing anybody can do to alter the outcome. Thus government should stay out of it, and the public interest community should go home. To me, this is both fatalistic and simplistic.

A decentralist would say that deregulation alone is not necessarily going to be sufficient to produce a decentralized NII. It might be and it might not. But if it is not, we do not need to be fatalists about it. We have the opportunity to try to influence the outcome, both by working at the level of raising consciousness and through helping draft legislation ratifying some sort of hard-fought compromise that achieves certain goals (e.g. for new common carriage or new universal service). This embodies the EFF approach.

continued on page 78

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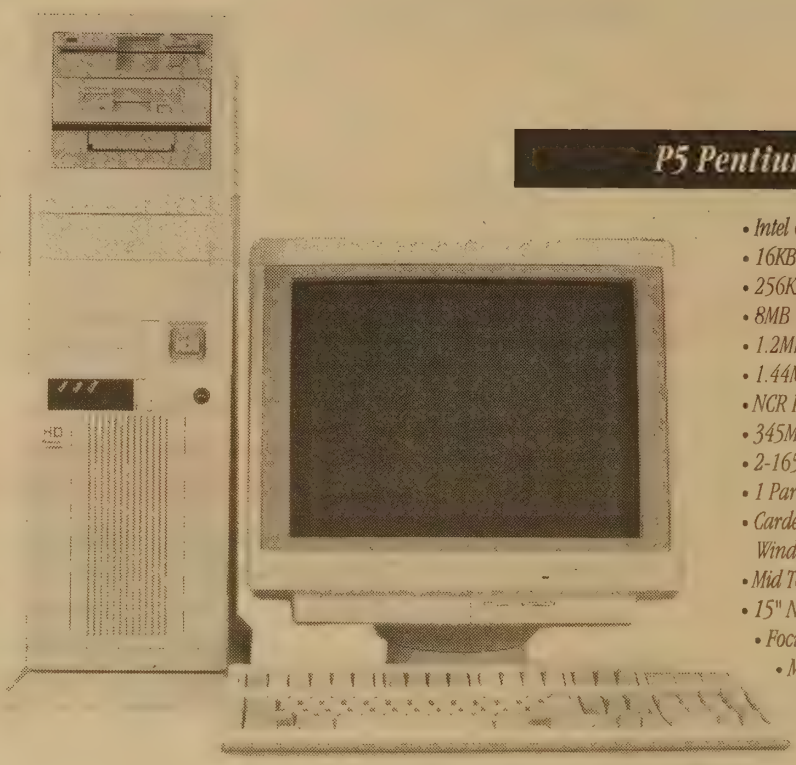

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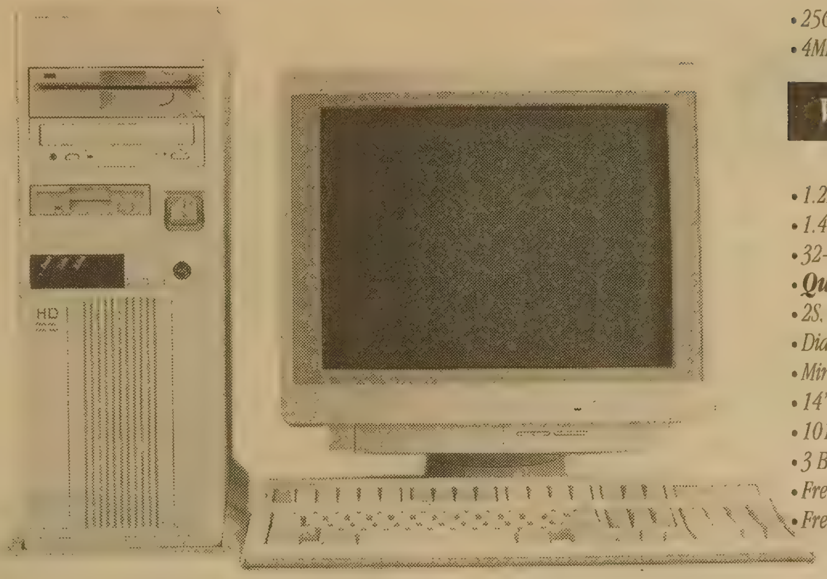

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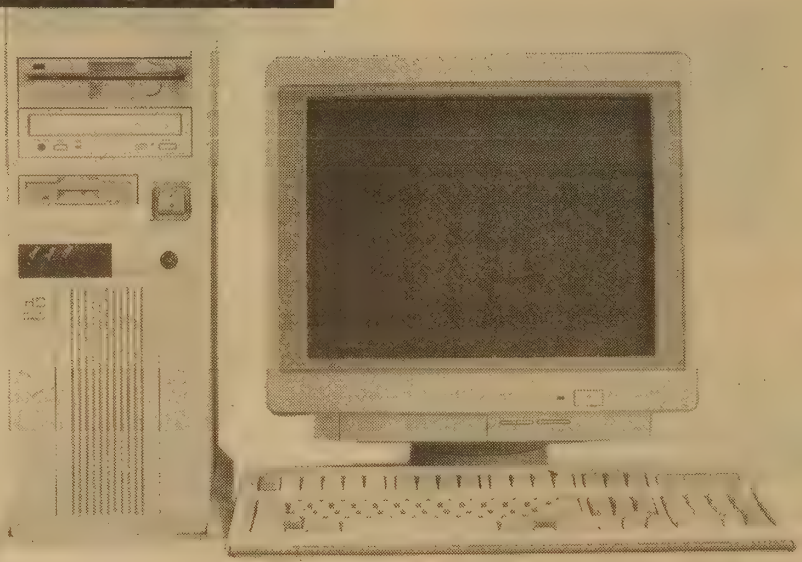

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- SCSI CD-ROM, 200ms, 330KB/sec
- Multi-Spin/Multi-Speed
- 256K Cache Buffer
- Kodak Photo CD
- Caddy included

Internal	**$345**
External	**$445**

PANASONIC/CR562 CD ROM & Card
- Includes Audio Card & Controller
- 320ms/300KB/sec
- 64K Cache
- Double Speed **$195**

PANASONIC/CR522 CD ROM & Card
- Includes Audio Card & cables
- 380ms
- 64K Cache **$145**

SONY/New Multi Speed 300KB/Sec
- 31A-03 CD ROM
- Controller Card
- Cables and Software **$199**

SONY/561 SCSI CD ROM
- Double Speed
- 285 ms/300kb/Sec
- 256K Cache **$365**

NEC/CDR84-1 SCSI

Internal	**$339**
External	**$445**

NEC/New Triple Speed:
3Xi
- 450Kb/Sec/190ms

Internal	**$495**

3Xe
- 450Kb/Sec/190ms

External	**$615**

TEAC/CD-50
- SCSI CD ROM **$275**

TEXEL
- 3082 SCSI CD ROM 240ms Multi-Spin Caddy & Manual **$275**
- DM-5028 External w/Caddy **$365**

More Than 500 CD Titles are Available!!!

TV Cards

Sigma Reel Magic MPEG Board	**$405**
TVator Pro, IBM PC to TV Convertor	**$249**
TVator Pro, Megavision	**$319**
Mozard TV Card	**$99**

Sound Cards

Mitac	
16 Bit Sound Card w/Speaker	**$129**
Genoa	
8 Bit Sound Card w/Speaker	**$69**
Mozard 16 Bit Sound Card	**$99**
Creative Labs	
Sound Blaster Pro Deluxe	**$106**
Sound Blaster 16 Basic	**$126**
Sound Blaster 16 SCSI 2/with ASP	**$182/212**
Sound Blaster 16 MultiCD/with ASP	**$165/195**
Video Blaster	**$305**
Wave Blaster	**$179**
Media Vision	
Pro Audio Spectrum 16	**$147**
Pro Audio Studio 16	**$189**
Gallant	
MIDI Kit	**$39**
Gallant 4000 w/Interface, Speaker & Microphone	**$79**
Gallant 5000 16 Bit Stereo w/Interface, Speaker & Microphone	**$109**
Gallant 6000 16 Bit/ASP Speaker & Microphone	**$159**
Logitech	
Logitech SoundMan 16, 16-bit Sound Card	**$98**

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Gallant GSP 1000 8000 Speaker	**$85**
Gallant GSP 330 40W Speaker	**$55**

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NOTEBOOK

Twinhead Powerful Mono Notebook

- Intel 486DX CPU
- 4MB RAM Expandable to 20MB
- 1.44MB Built-in Floppy Disk Drive
- One Serial Port, One Keyboard/Mouse Port
- 84 Keys Keyboard with 12 Function Keys
- Monochrome, 64 Shade Sidelit Display
- MS DOS 6.0, MS Windows 3.1
- Physical Dimensions 8.5" x 11" x 1.8"
- Weight with Battery 5.8 lbs

486DX-33 w/130MB HD	**$1988**
486DX-33 w/200MB HD	**$2130**
486DX2-66 w/200MB HD	**$2590**

Twinhead Brilliant Color Notebook

- Intel 486DX CPU
- 4MB RAM Expandable to 20MB
- 1.44MB Built-in Floppy Disk Drive
- One Serial Port, One Keyboard/Mouse Port
- 84 Keys Keyboard with 12 Function Keys
- 256 Color Display, Active Color Matrix
- Video Card w/512K RAM
- MS DOS 6.0, MS Windows 3.1
- Physical Dimensions 8.5" x 11" x 1.8"
- Weight with Battery 6.3 lbs

486DX-33 w/130MB HD Active Color	**$2555**
486DX2-66 w/200MB HD Active Color	**$2795**
86DX-33 w/130MB HD Dual Scan Color	
486DX-33 w/200MB HD Dual Scan Color	**$3695**
486DX2-66 w/200MB HD Dual Scan Color	**$4155**

MTC-4020 Mono/Color Notebook

- Intel 486SX-25/SX-33 CPU
- 4MB RAM Expandable to 20MB
- 130MB IDE Hard Disk
- One Serial Port, One Keyboard/Mouse Port
- One External VGA Connector
- One PS II Keyboard/Mouse Connector
- 85 Keys Keyboard with Inverted " T" cursor Keys
- Build-in 1.44 MB Floppy Disk Drive
- Build-in 16mm Trackball
- Preloaded with Microsoft DOS and Windows
- 11" (W) x 8.5" (D) x 1.9" (H)/5.5lbs

MTC-Mono	**$1265**
MTC-Color	**$1815**

MNB-4010 Subnote

- Intel 486SX-25 CPU
- 4MB RAM Expandable to 20MB
- 2 PCMCIA Level II or Single Level III Slots
- Two Serial, One Parallel Connector
- One External VGA Connector
- One PS II Keyboard/Mouse connector
- 79 Keys Keyboard with Inverted " T" cursor Keys
- Build-in 16mm Trackball
- Windows Sound System Compatible Sound Option
- Preloaded with Microsoft DOS and Windows
- Physical Dimensions 10.5" x 7.8" x 1.5"
- Weight : 4lbs

MNB 80MB HD	**$1375**
MNB 130MB HD	**$1435**

• **Pocket Lan Coax (for notebook)**	**$137**
• **Pocket Lan 10 Base-T (for notebook)**	**$140**
• **14400 Fax/Moden Mini-Pocket (for notebook)**	**$229**

Twinhead 4 Pounds Powerful Subnote

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- PCMCIA Slot
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- Physical Dimensions 7.1" x 10" x 1.6"
- Weight with Battery 4 lbs

486SLC-33 Only	**$1395**

Accesories

• Mini-Pocket 14.4 Fax Modem	**$229**
• Dlink DE-600TP Pocket Ethernet	**$199**
• Dlink EN-6000B Pocket Lan BNC	**$137**
• Danpex EN-6000T Pocket Lan 10BT	**$140**
• EP 888A Pocket Lan BNC + 10BT	**$145**

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ISA-486 Windows Accelerator System

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- 2H/2F IDE Disk Controller
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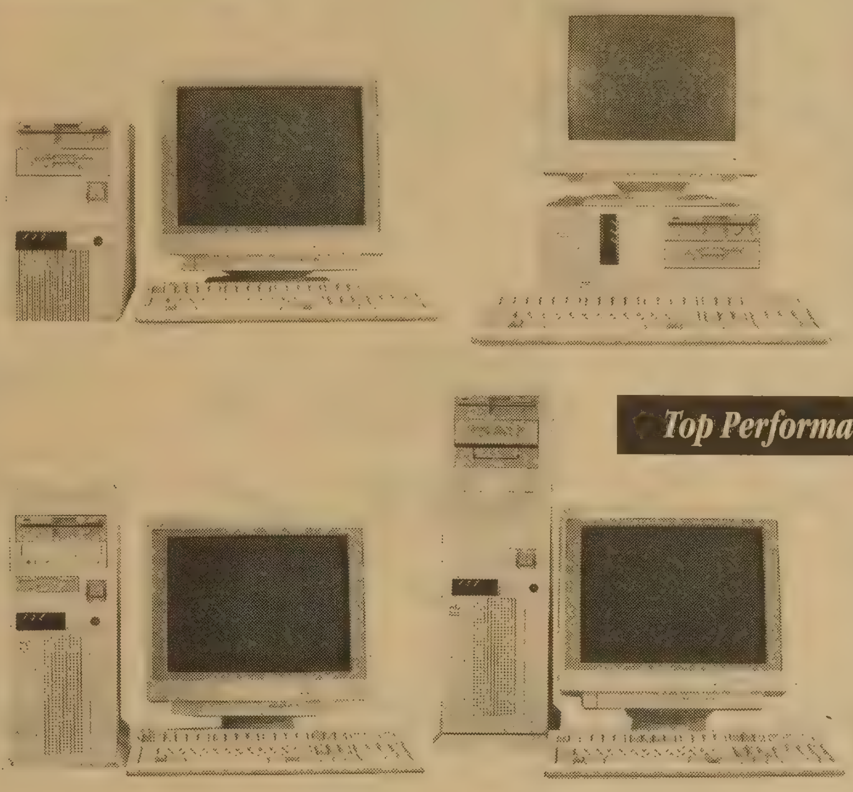
- 101-key Enhanced Keyboard
- 3 Button Serial Mouse
- Free Mouse Pad
- Free Software Option

SX-25	**$1035**
SX-33	**$1065**
DX-33	**$1195**
DX-50	**$1295**
DX2-66	**$1395**



Top Performance EISA/VESA System

- Intel DX-486 Processor
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- 8KB Internal Cache
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- 1.44MB FDD
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- 2 16550 UART High Speed Serial Port
- 1 Parallel Port
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- Cardex ET-4000 W32 VL-B Graphic Accelerator Card/1MB
- Mid Tower Case w/ 250W Power Supply
- 14" ViewSonic 6E Non-interlaced Monitor
- 101-key Keytronic Keyboard
- 3 Button Serial Mouse
- Free Mouse Pad
- Free Software Option

DX-33	**$1995**
DX-50	**$2110**
DX2-66	**$2195**

HD 386 Systems Below $900

- 4MB RAM (Max. 32MB)
- 1.44MB FDD
- 130MB IDE HDD
- 2H/2F IDE Disk Controller
- 2S, 1P, 1G Ports
- 16-bit SVGA Card/1MB
- Mini Tower Case w/ 200W Power Supply
- 14" SVGA Monitor, .39 dpi
- 101-key Enhanced Keyboard
- 3 Button Serial Mouse
- Free Mouse Pad

386SX-33	**$825**
386DX-33/64K Cache	**$855**
386DX-40/64K Cache	**$855**

With Purchase of New System only

M.S. DOS 6.2	$45
M.S. Windows for Workgroups ADD on 3.11	**$58**

Free Software Option:

- PFS: Windows works
- PFS: Publisher
- PFS: Prospect
- PFS: First Choice
- CD Title: Toolworks Encyclopedia

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(OEM)
$34

Colorado
DJ-20 250MB
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Quantum
270MB IDE HD
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Sound Cards,
60w Speakers & 5 CD Titles
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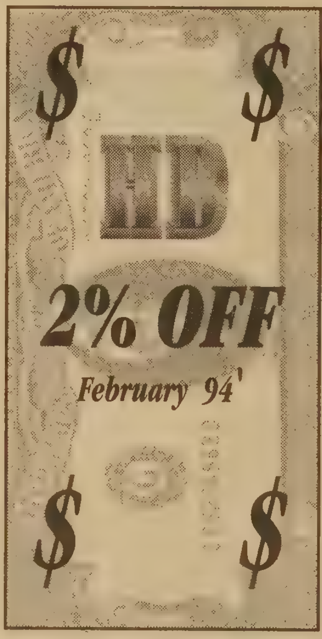

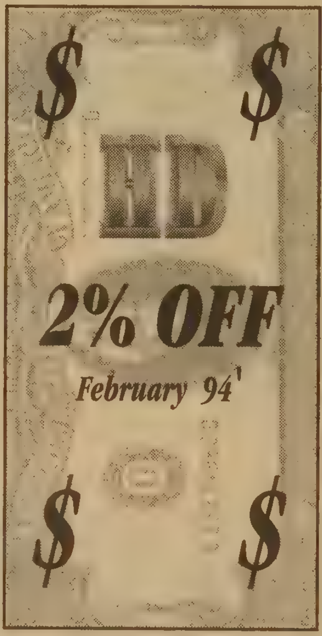

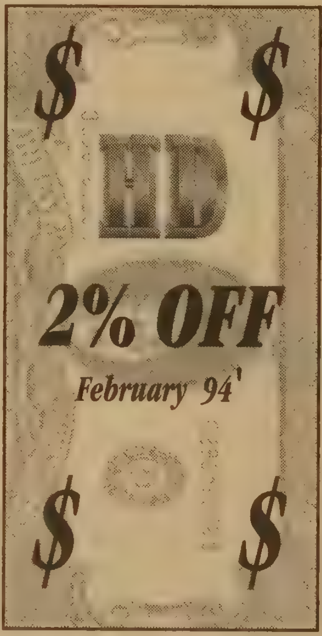

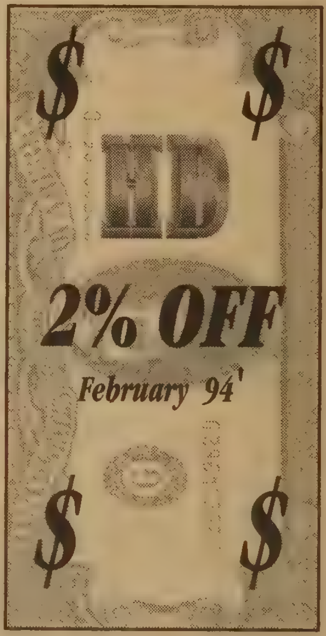

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IDE Hard Disk

250MB, IDE, 14ms	$219
340MB, IDE, 13ms	$255
540MB, IDE, 12ms	$495

SCSI Hard Disk

Capacity	M/N	Cache	Speed	Size	Internal	External
170MB	CP30170	64K	17ms	3.5x1	$225	$349
212MB	CP30200	256K	12ms	3.5x1	$285	$399
540MB	CP30540	256K	12ms	3.5x1	$525	$639
1.0GB	CPF1060S	256K	10ms	3.5x1	$995	$1119

WESTERN DIGITAL

250MB, IDE, 13ms, 2 Yr. Warranty	$225
340MB, IDE, 12ms, 3 Yr. Warranty	$275
420MB, IDE, 13ms, 3 Yr. Warranty	$355
540MB, IDE, 12ms, 3 Yr. Warranty	$525

Maxtor

IDE

131MB, IDE, 14ms, 1 Yr. Warranty	$169
245MB, IDE, 15ms, 1 Yr. Warranty	$219
345MB, IDE, 14ms, 2 Yr. Warranty	$265
540MB, IDE, 8.5ms, 256K Cache,2 Yr. Warranty	$615

SCSI

245MB, SCSI, 15ms, 2 Yr. Warranty	$235
345MB, SCSI, 14ms, 2 Yr. Warranty	$335
540MB, SCSI, 8.5ms, 256K Cache, 2 Yr. Warranty	$615
1.2GB, SCSI, 8.5ms, 256K Cache, 2 Yr. Warranty	$1295

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***540 MB IDE* $485**
128K Cache, 3.5X1"

***270 MB IDE* $229**
128K Cache, 3.5X1"

***1.2GB SCSI* $955**
512K Cache

IDE

Capacity	M/N	Cache	Speed	Size	Price
85MB	ELS85A	32K	17ms	3.5x1	$159
127MB	ELS127A	32K	17ms	3.5x1	$169
170MB	ELS170A	32K	17ms	3.5x1	$179
240MB	LPS240A	256K	Fast	3.5x1	$229
270MB	LPS270A	128K	Fast	3.5x1	$229
525MB	LPS525AT	512K	Fast	3.5x1	$549
540MB	LPS540AT	128K	Fast	3.5x1	$485

SCSI

Capacity	M/N	Cache	Speed	Size	Internal	External
170MB	ELS170S	32K	17ms	3.5x1	$185	$325
240MB	LPS240S	256K	Fast	3.5x1	$245	$355
270MB	LPS270S	128K	12ms	3.5x1	$265	$375
525MB	LPS525	512K	10ms	3.5x1	$545	$665
700MB	PD700	512K	10ms	3.5	$735	$859
1.0GB	PD1050S	512K	10ms	3.5	$865	$979
1.2GB	PD1225S	512K	10ms	3.5	$955	$1079
1.8GB	PD1800S	512K	10ms	3.5	$1295	$1429

Seagate

1.7GB Fast SCSI-II 3.5" 9ms 5year Warranty **$1299**

Capacity	M/N	Cache	Speed	Sixe	Int.	Ext.
341MB	ST3390N	256K	12ms	3.5x1	$399	$529
456MB	ST3550N	256K	12ms	3.5x1	$559	$679
525MB	ST3600N	256K	10.5ms	3.5x1	$679	$799
1.05GB	ST11200N	256K	10.5ms	3.5	$995	$1125
1.0GB	ST31200N	256K	9ms	3.5x1	$1089	$1199
1.4GB	ST41651N	256K	15ms	FH	$1099	$1299
1.9GB	ST42100N	256K	13ms	FH	$1489	$1689
2.1GB	ST42400N	256K	11ms	FH	$1749	$1949
2.1GB	ST12400N	256K	9ms	3.5	$1389	$1589
2.9GB	ST43400N	512K	10ms	FH	$2299	$2499
2.9GB	ST43401N	512K	Fast Wide SCSI II	5.25	$2499	$2895

FUJITSU

• 128MB Removable Optical Diskette • Rewritable • 3.5" Diskette Size of Floppy • Unlimited Storage • Ideal for Data Mobility • Fast Access time and Data Transfer. • ISO Standard. 128MB Rewritable Optical SCSI Drive

***Internal Drive* $789**

- Bare Optical Drive
- Low Profile, Only 1"
- 256K Cache
- 2511A
- Fast 30ms Seek Time
- 3600RPM

***External Drive* $899**

- External Optical Drive
- Formatting Software for MAC (Free upon request)
- Includes 1 cartridge
- 2511A

***520MB SCSI 3.5"* $535**

- 3.5" HH Drive
- 12 ms Seek Time
- 240K Read/Write Cache (SCSI)
- 5 Yr. Warranty

SCSI

Capacity	M/N	Cache	Speed	Size	Internal	External
520MB	M2624FA	240K	12ms	3.5	$535	$640
1.0GB	M2694ESA	256K	10ms	3.5	$865	$975
2.0GB	M2654SA	256K	12ms	FH	$1455	$1655

IDE

Capacity	M/N	Cache	Speed	Size	Price
520MB	M2624T	64K	12ms	3.5	$585

MICROPOLIS

MC2217
1.75GB Fast SCSI-II 3.5" 10ms Seek Time 5400 RPM **$1295**

IDE

Capacity	Model	RPM	Speed	Size	Internal
1.0GB	MC2210A	5400	10ms	3.5	$895
1.75GB	MC2217A	5400	10ms	3.5	$1295

SCSI

1.0GB	MC2210	5400	10ms	3.5	$845	$965
1.0GB	MC2210AV		Audio/Visual		$1099	$1229
1.75GB	MC2217	5400	10ms	3.5	$1295	$1425
1.75GB	MC2217AV		Audio/Visual		$1399	$1499
1.8GB	MC1548	3600	14ms	FH	$1499	$1699
2.0GB	MC1926	5400	11ms	FH	$1699	$1899
3.0GB	MC1936	5400	11ms	FH	$2499	$2699

SyQuest

105MB Internal	105MB External
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MODEL	TYPE	DESCRIPTION	PRICE
P5-MPS	Pentium PCI	3 PCI, 4 ISA Slots, Flash EPROM BIOS, 256K Cache up to 512K, 0MB RAM up to 192MB	$499
S1441	Pentium Local Bus	3 VESA, 8 ISA Slots, 256K Cache up to 2MB, 0MB RAM up to 128MB	$485
486SP3	486PCI Local Bus	3 PCI, 4 ISA Slots, ZIF Socket, 256K Cache up to 512K, 0MB RAM up to 128MB, Built-in PCI SCSI Controller, Built-in IDE Disk Controller, Built-in 2 Serial, 1 Parallel Ports	$439
486SVI	EISA/VESA	8 EISA, 2 VESA Slots, Zif Socket, AMI BIOS, 256K Cache up to 1MB, 0MB up to 256MB	$359
S1437	EISA/VESA	7 EISA, 1 VESA Slots, SIS Chipset, AWARD BIOS, 256K Cache, 0MB up to 128MB	$335
VL-SV2	VESA Local Bus	7 ISA, 2 VESA Slots, SIS Chipset, ZIF Socket, 128K Cache up to 256K, 0MB RAM up to 32MB	$165
VL-CV2	VESA Local Bus	8 ISA, 2VESA Slots, Contaq-A Chipset, ZIF Socket, 128K Cache up to 256K, 0MB RAM up to 32MB	$165
CLT486VLS2	VESA Local Bus	Made in USA, 8 ISA, 2 VESA Slots, Contaq-A Chipset, ZIF Socket, 128K Cache up to 256K, 0MB RAM up to 128MB	$185
MST453SG	Green Mode VESA Local Bus	8 ISA, 3 VESA Slots, SIS Chipset, Zif Socket 128K Cache up to 256KB, 0MB RAM up to 32MB	$185
GVL-CV3	Green Mode VESA Local Bus	7 ISA, 3 VESA Slots, Contaq-A Chipset, ZIF Socket, 128K Cache up to 1MB, 0MB up to 128MB	$195

386SX-33/CPU	$135
386DX-40/64K/CPU	$145
386DX/64K (Motherboard Only)	$105

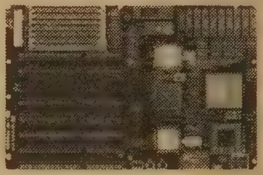
Micronics

VESA Local Bus/256K/DX-33 CPU	$660
VESA Local Bus/256K/DX2-66 CPU	$875
JX30 VESA Local Bus/256K/DX2-66 CPU	$925
EISA VLB/256K/DX-33 CPU	$845
EISA VLB/256K/DX2-66 CPU	$1060

AMI Motherboard

Enterprise III EISA/VESA /256K/486DX-33 CPU	$865
Enterprise III EISA/VESA/256K/486DX2-66 CPU	$1089
Enterprise IV EISA/VESA /256K/486DX-33 CPU	$745
Enterprise IV EISA/VESA/256K/486DX2-66 CPU	$990
Super Voyager VL-B/256K/486DX-33 CPU	$595
Super Voyager VL-B/256K/486DX2-66 CPU	$855

ORCHID



486 VESA Local Bus/256K/DX-33 CPU	$465
486 VESA Local Bus/256K/DX2-66 CPU	$675

Modems

Zoltrix 2400 Modem	$40
Zoltrix 9600/2400 Fax Modem	$65
Zoltrix 14400 Fax Modem	$145
US Robotics 14400 (Int)	$145
US Robotics 14400 (Ext)	$163
DSI 14.4K Internal Fax Modem	$129
DSM 1914XE Turbo External 19.6K Modem, 14.4K S/R Fax	$249
DSM 1414XB Internal w/ UART 16550 14.4.K Modem, 14.4. S/R Fax	$139
DSM 1414XA External, Rockwell Technologies, 14.4K Modem, 14.4K S/R Fax	$169
DSM 1414XP Mini-Pocket, 14.4K Modem, 14.4 S/R Fax	$229
DSM 2442XE External w/ Data-Tack Switch, 2400 Modem, 9600 S/R Fax	$99
Hay-Opt 144-F External Fax Modem	$385
Hap Opt 144I-F Internal Fax Modem	$369
Hay-A144E-F Accura External Fax Modem	$239
Hay-A144I-F Accura Internal Fax Modem	$219
Intel 14.4K External Fax Modem	$185
Intel 14.4K Internal Fax Modem	$165
Mitac 14.4K External Fax Modem	$149
Mitac 14.4K Internal Fax Modem	$129
Tyin 2000 Fax Modem Audio Card	$209

Tape Back-Up

Viper

2150S, 250MB VIPER, 6MB/Min	Internal	$339
	External	$449
2525S, 525MB VIPER, 6MB/Min	Internal	$499
	External	$599

ARCHIVE

(For IBM Compatibles, SUN, MAC & NeXT) Anaconda, 36MB, Min, SCSI-2, 1/4" Tape Unit

1.3GB 2750	Internal	$799
	External	$899
2.0GB 2800	Internal	$999
	External	$1099

SUMMIT

With Central Point Backup Software, Runs off Floppy Port

120MB	Internal SE-120	$129
250MB	Internal SE-250	$159

Colorado Memory Systems

Uses 2120 Tapes, Runs off Floppy Port

120MB	Internal DJ10 Jumbo 120	$99
250MB	Internal DJ20 Jumbo 250	$159

TRAKKER

Parallel Printer Port External Tape Backup Systems, Runs off Parallel Printer Port

120MB	External Trakker 120	$289
250MB	External Trakker 250	$329

WANGDAT

SCSI 4mm DAT

2.0GB (3100DAT)	Internal	$999
	External	$1099
4-8GB (3200DAT)	Internal	$1099
	External	$1199

MicroSolutions

Parallel Port	250MB External Tape Back-up	$359
Double Speed Parallel Port	External CD-ROM Backpack	$395

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Video Cards

Graphic Ultra+Windows Accelerator	
Graphic Ultra Pro	
Accelerated 1024x768 at 256 Colors - up to 74Hz. Non-interlaced.	
1MB VRAM	$275
2MB VRAM	$365
with ATi Bus Mouse	add $25
Graphics UltraPro 2MB EISA	$395
Graphics Ultra Pro VLB Mach 32	
1MB VRAM	$295
2MB VRAM	$395
MACH32 - 16.7 Million Colors	
MACH32 PCI 2MB	$445
1MB DRAM	$205
2MB DRAM	$235
with ATi Bus Mouse	add $25

DIAMOND
Computer Systems, Inc.

Diamond	
Stealth Pro 1MB/2MB ISA	$245/345
Stealth Pro 1MB/2MB VLB	$255/335
SpeedStar Pro VESA or ISA	$125
Stealth 24 VESA or ISA 1280x1024	$155
Viper VLB 2MB VRAM Accelerator	$365
Viper PCI 2MB VRAM Accelerator	$435

ORCHID

ORCHID	
Celsius VLB 1MB VRAM/2MB	$225/285
Fahrenheit 1280 Plus 1MB	$149
Fahrenheit 1280 Plus VLB 1M/2M	$169/199
Fahrenheit VA or VA/VLB 1M/2M	$175/205

SPiDER® Graphics, Inc.

Spider 32BLV	
VESA Local Bus, 1280x1024 in 256 colors, 1024x768 @ 72Hz	
1MB DRAM	$95
2MB DRAM	$135
Spider 32VLB Plus	
VESA Local Bus, 1280x1024 in 256 colors, 1024x768 @ 72 Hz, 30% Faster Than VLB	
1MB DRAM	$115
2MB DRAM	$165
Black Widow	
VLB, IIT AGX-015, XGA Graphics Engine, VRAM 32-bit OS/2 2.1 Drive Support, up to 100Hz Refresh Rate	
1MB DRAM	$209
2MB DRAM	$265

CARDEXPERT

ET-4000	1MB ISA	$85
ET-4000W32 VL-B	1MB	$125
ET-4000W32i VL-B	2MB	$185
ET-4000 W32P PCI	2MB	$265
ET-4000	1MB ISA True Color	$95
CIrrus Logic 5420	1MB ISA	$59
Cirrus Logic 5426 VLB	1MB	$95
Cirrus Logic 5428 VLB	1MB	$99
UMC VLB VGA	1MB Built-in IDE/2S1P1G	$115
WD Chipset ISA	1MB	$95

AMI

Fast View VLB	2MB RAM, Windows Accelerator Card	$359

matrox

MGA-ULT/2/A	2MB ISA	$679
MGA-IMP/3/A	3MB ISA	$979
MGA-IMP/3/V	3MB VLB	$979
MGA-PRO/4.5/V	4.5MB VLB	$1595
MPA-PRO/4.5Z/V	Z-Buffer VLB	$1895

Number Nine
Computer Corporation
Excellence in PC Graphics

9GXI L-25F	3MB ISA	$1259
9GXE L-10	1MB ISA	$249
9GXE L-10	1MB VLB	$249
9GXE L-11	2MB ISA	$345
9GXE L-11	2MB VLB	$345
9GXE L-12	3MB ISA	$425
9GXE L-12	3MB VLB	$425
9GXE L-14	4MB ISA	$595
9GXE L-16	VLB	$895

Hercules

HG720	Graphite VL Pro 2MB	$449
HG310	Graphite Pro 1MB ISA	$329
HG610	Graphite Pro 1MB VLB	$329

DYNAMITE

D301 PRO	1MB ISA	$189
D302 PRO	2MB ISA	$259
D601 PRO	1MB VLB	$189
D602 PRO	2MB VLB	$259

SVGA Video Cards		
SVGA 256K Video Card		$29
SVGA 1024x768	1 MB	$59
SVGA VESA Local Bus		$79
S3 PCI Video Card	1MB	$195

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Monitors

SONY

CPD 1430	14" SVGA	.25 dpi	$565
CPD 1730	17" SVGA	.25 dpi	$995
GDM 17SE1	1600 X 1280	.25 dpi	$1230
GDM2038	20" State of the Art		$2185

HITACHI

CM2095	20", .31 dpi, 1280x1024 NI	$1325
CM2187	21", .28dpi, 1600x1280 NI	$2135

MITSUBISHI (IBM and Mac)

15"	Diamond Scan 15FS .28 dpi Anti-static/anti-glare Flat Screen	$495
17"	Diamond Scan 17FS .28 dpi Flat Screen with Invar Shadow Mask	$1045

NANAO

F550i	17"	Non-interlaced	1280x1024	.28 dpi	$955
F550iw	17"	Non-interlaced	1280x1024	.28dpi	$1159
F560iw	17"	AKA: the Green Monitor			$1375
T560i	17"	Non-interlaced	1280x1024	.25 dpi	$1629
T660i	20"	Trinitron Tube	1280x1024	.28 dpi	$2379
T750i	21"	Non-interlaced	1280x1024	.32 dpi	$1989
F760i	21"	1280x1024 @ 74Hz		.31 dpi	$2095

MAG

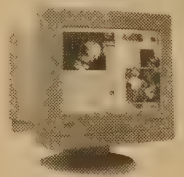
15FG	15" Non-interlaced 1280 X 1024Flat Screen .28	$495
17FG	17" 1280 X 1024 Flat Screen .26	$935

14" Mono Monitor			$95
14" VGA Mono Monitor			$119
14" SVGA	.39 dpi	1024 X 768	$219
14" SVGA	.28 dpi	1024 X 768	$245
14" Non-Interlaced SVGA	.28 dpi	1280x1024	$259
14" Standard	.28 dpi	1280x1024 NI	$285
15" Non-Interlaced SVGA*	.28 dpi	1280x1024 Flat Screen	$385
17" Non-Interlaced SVGA*	.26 dpi	1280x1024 Flat Screen	$799

**Low Radiation, IBM, Mac, compatible*

NOKIA (IBM and Mac)

449E	15" Max-80Hz	.28dpi Digi Control	1024x768 Green Monitor	$555
447B	17" Max-110Hz	.26dpi Trinitron Digi Control	1280x1024	$965
445M	21" Max-120Hz	.26dpi Digi Control	1280x1024 Green Monitor	$1999
445X	21" Max-120Hz	.26dpi Digi Control	1600x1200 Green Monitor	$2659



NEC

JC1431	14"	1024x768	$325
3FGe	15"	1024x768 @ 60Hz	$575
4FGe	15"	1024x768 @ 76Hz	$685
5FGe	17"	1024x768 @ 76Hz	$1075
5FGp	17"	1280x1024 (with Opticlear)	$1440
6FG	21"	1280x1024 @ 74Hz	$2389
6FGp	21"	1280x1024 (with Opticlear)	$2495

ViewSonic

The New Generation

ViewSonic 6E

14" .28 dpi Non-interlaced $280

ViewSonic-15 15" .28 dpi $445

ViewMatch Color Monitor

1280x1024, Non-interlaced, 76Hz at 1024x768, Flat Screen

ViewSonic-17 17" .28 dpi $999

76Hz at 1280x1024, Non-interlaced, Flat Square Screen

ViewSonic-20 20" .28 dpi $1635

1600x1280, Non-interlaced, Dual Page Display

ViewSonic-21 21" $1895

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Controllers

adaptec

SCSI Controllers

1522	16-bit 7HD/2FD Kit	$148
1542C	Bus Master Complete Kit	$245
1542C+	Bus Master Kit with Corel SCSI	$312
2742	EISA Kit 14HDS	$395
2842	VESA Kit Fast SCSI II	$325
1510ACDK	For CD ROM	$95

AMI

SCSI Controllers

FastDisk EISA Caching Controller up to 16MB	$449
FastDisk VLB VESA Local Bus Caching Controller	$449

DATA TECHNOLOGY CORPORATION

SCSI Host Adapter, Supports 7 SCSI Devices, up to 8 GB each, Floptical support thru the BIOS

DTC 3270VL VESA Local Bus	$129
DTC 2278 VLB IDE	$39

TRANTOR®

ASPI Device Driver for: CD-ROMs, Photo CD, Tape Drives, Syquest, Opticals, Scanners, Hard Drives	$49
EPP Mini SCSI	$209

BusLogic

SCSI Controllers

BT542	Busmaster SCSI-II Kit	$219
BT445S	VESA SCSI-II Kit	$299
BT545KT	Bus Master Fast SCSI	$229
BTB742KT	EISA SCSI-II Kit	$315
BTB747AK	EISA Fast SCSI Kit	$379

PROMISE TECHNOLOGY, INC.

VLB Cache Controller		$128
DC-200	ISA IDE Cache	$95
DC-200M	ISA IDE/512K	$129
DL-420	VLB IDE/512K	$124
DC-4000	VLB IDE	$55

ORCHID

IDE VLB	VESA Local Bus	$69

UltraStor

SCSI Controllers

14F	FD/HD (10MB/sec)	$195
24F	EISA, 64K, Fast (33MB/sec)	$359
34F	VESA Local Bus Controller	$269
GSI-21-V	Intelligent IDE	$69
Co-Resident	Intelligent IDE	$49

VITEX

DC-FD/2 FD Controller 2 Port	$19
DC-FD/4 FD Controller 4 Port	$25
DC-IDE/4FD/2FD/2S1P1G/2.88	$45
DC-IDE/VLB/2S1P1G Ext. to VLB	$27
DC-IDE/2000 VLB/2S1P1G	$39
IO-2S2P 2 Serial 2 Parallel	$25
IO2S2P/16552 Serial/16650, 2 Parallel	$45
MGP Card	$19
MCGP Card	$19

TECO

DC-600B	ISA/IDE Cache	$129
DC-620B	EISA/IDE Cache	$199
DC-680	VLB/IDE Cache	$149
DC-800B/1MB	ISA/Fast SCSI II Cache Mirroring Controller/1MB RAM Built-in	$299
DC-820	EISA/Fast SCSI II Cache Mirroring Controller	$479

ATEN

VESA IDE/IO 2S1P1G	$45
16-bit Super IDE/IO 2-16550	$59
16-bit IDE/IO 2S1P1G	$25
2-16550 High Speed I/O Card	$42

NCR PCI SCSI II HD Controller	**$125**

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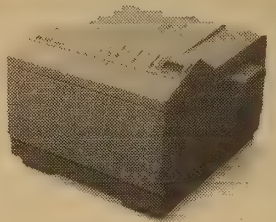
Printers

HEWLETT PACKARD



HP DeskJet 500	$295
HP DeskJet 500c	$395
Hp DeskJet 550c	$585
Hp LaserJet 4	$1349
Hp LaserJet 4M	$1865
Hp LaserJet 4L	$669
Hp LaserJet 4P (2MB)	$975
(4MB)	$1375

Panasonic
Office Automation OA

2123	24-pin	$239
2124	24-pin	$319
2624	24-pin Quiet	$399
2180	9-pin	$169
4430	Laser 1MB	$669

Mouse, Joystick & Scanner

MicroSoft Serial Mouse (OEM)	$34.00
Microsoft Bus Mouse (OEM)	$59.00
Logitech MouseMan (Serial)	$55.00
Logitech Bus Mouse	$65.00
Logitech Trackball	$74.00
Logitech ScanMan Easy Touch	$199.00
Logitech ScanMan 256 w/ Omni Page	$189.00
Logitech CyberMan 3D Mouse	$79.00
Z-Nix Cordless Mouse	$28.00
3-Button Serial Mouse	$9.90
Joystick	$14.00
Mouse Holder	$2.50
Mouse Pad	$2.50
BTC-6700 ScanFlex ScanCopy Fax	$499.00

Keyboards

101 Key Enhanced Keyboard	$29
Keytronic 101	$36
OMNI101	$98
OMNI102	$95
OMNI Ultra (T or F)	$95
Focus 9000 129 Keys Programmable	$65
Focus 8000 111 Keys w/ Calculator	$55
Focus 7000 With Track Ball	$59
Focus 2001 Click 101	$42
ProXellent 121 Keys Programmable (White)	$79
ProXellent 121 Keys Programmable (Black)	$89
KB-5181 Mechanical Firm Click	$35
KB-5311 101 Keys Membrane	$25
KB-5591 Trackball Keyboard	$49
PN501 Plug N' Save	$59

Accessories

3.5" DS/DD Disk	25 Pack	$8.99
3.5" DS/HD Disk	25 Pack	$9.99
5.25" DS/DD Disk	25 Pack	$6.50
5.25" DS/HD Disk	25 Pack	$7.50
3.5" DS/DD	10 Pack 3M	$7.00
3.5" DS/HD	10 Pack 3M	$8.50
5.25" DS/HD	10 Pack 3M	$8.00
DC-2120	3M	$13.00
Power Center	UL	$18.00
Power Strip	Plastic, UL	$5.00
Disk Box	5.25" x 100	$6.00
Disk Box	3.5" x 80	$6.00
Data Swtiches	DB25AB	$8.00
Data Switches	DB25 ABCD	$16.00
Mouse Pad		$2.50
Monitor Filter	14" Glass	$10.50
Dust Cover	Keyboard	$3.00
Dust Cover	CPU & Monitor	$5.00
Disk Clean Kit	5.25" or 3.5"	$2.50
Printer Cable	6'/10'	$3/$6
Printer Cable	15'/25'	$7/$9
RS232	DB25 10'/25'	$6/$10
Keyboard Ext. Cable	6'	$3.00
Modem Cable		$4.00
SCSI I/SCSI II Cable		$11/$40
Accessory Complete Kit		$34

- Mouse, Mouse Pad, Mouse Holder, Dust Cover, Power Strip, Optical Glass FIlter, 5.25" and 3.5" Cleaning Disk, 5.25" 2HD Diskette 5pcs & Box, 3.5" 2HD Diskette 5 pcs. & box, 5.25" 50 pcs Diskette box

486 CPU Cooling Fan	$9.50
586 Pentium CPU Cooling Fan	$19
14" Color Monitor FIlter	$8
14" Anti-Glare Filter	$29
Printer Stand	$9
Mouse Holder	$2.50

And More...

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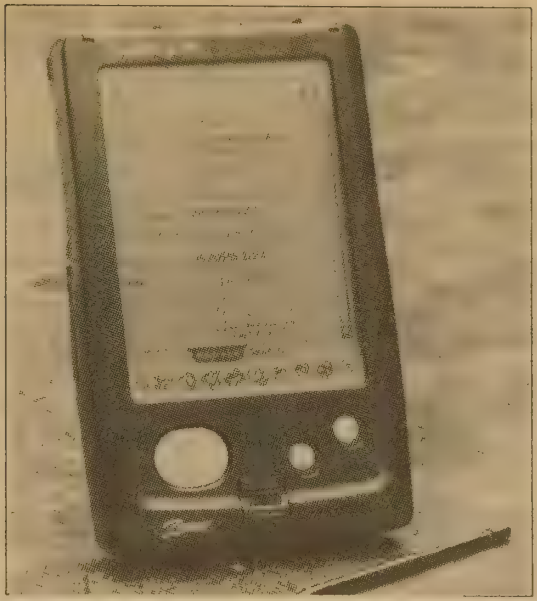

The Zoomer: Casio/Tandy's PDA

Plus: Daytimer™ For Newton, PCMCIA Products, File Transfer Software

BY MITSU HADEISHI

RESOURCES:

Casio Z-7000 Zoomer
Casio, Inc.
1-800-762-1241

Day-Timer™ Meeting & Expense Pack for the Apple Newton
Slate Corporation
15035 North 73rd St.
Scottsdale, AZ 85260
(602)443-7322
To order, call Apple StarCore,
1-800-708-STAR

HP Omnibook 300
Hewlett-Packard
1-800-538-8787

Visual Media SCSI PCMCIA Card
New Media Corporation
Irvine Spectrum
15375 Barranca Pkwy.
Building B101
Irvine, CA 92718
(714)453-0100

The Casio/Tandy Zoomer is a pen-based palmtop intended, quite clearly, to compete with the Apple Newton in functionality, appearance, and price. Closely resembling the Apple Newton's appearance, the Zoomer (also known as the Tandy Z-PDA or the Casio Z-7000) is even priced similarly at $600.

Measuring 4.25" x 7" x 1", the machine is also very close in physical dimensions to the Apple product; a bit too large to fit into a pocket comfortably, it is still small enough for a briefcase or jacket pocket. It comes with a serial port, an infrared port for unit-to-unit connection, a PCMCIA card slot for memory and peripheral expansion, and an earphone jack. However, don't let appearances deceive you: under the hood, things are quite different indeed.

HARDWARE: NEEDS MORE ZOOM

Firstly, the processor in the Zoomer is much less powerful than the RISC chip present in the Apple Newton. As a result, the unit is a lot slower than the Newton, and therefore capable of much less sophisticated handwriting recognition. Overall, the Zoomer simply "feels" more sluggish; it often takes several seconds to recognize and process your handwriting after you've finished writing something. In addition, it's considerably less "intelligent" than the Newton about recognition; rather than using neighboring letters as context, the machine simply recognizes one character at a time. This means it tends to make a lot of errors right in the middle of your words, where they are difficult to correct.

A friend of mine who's an avid user of the Newton was very curious to see the Zoomer; however, after using it for a short time, the first thing he said was "Wow, it's slow," followed by "I'm glad I bought a Newton."

My brother, a novice with pen-based systems but very fond of his organizer (so fond he refers to it as his "brain," carrying it with him in his pocket), was impressed by the appearance of the Zoomer, but when he used it, his reaction was "I don't like this," then, "There's no keyboard!" and then, after playing with it for a little while, "It's too slow."

> **The Zoomer comes with a considerably larger number of built-in applications than does the Apple Newton.**

My wife, after using the unit for a considerable amount of time, said that some of the claimed handwriting features didn't work very well (or at all); for example, using the back of the pen as an "eraser." She was also annoyed that you could not rest your hand on the screen, because, being a touch-sensitive device, it mistook this for pen pressure. This is not a problem with the Apple Newton, since its screen reacts only to their special stylus.

The pen in the Zoomer is a retractable device which fits in a little slot at the bottom of the unit. It's a bit tricky to get it out; the first few times I tried, either the pen did not emerge from the unit at all, or it would shoot out, flying across the room. After a little practice, I'm sure you could get used to it and be able to remove it without having this problem.

SOFTWARE: A BIG PLUS

The Zoomer comes with a considerably larger number of built-in applications than does the Apple Newton.

Perhaps this can be partially attributed to the fact that the Newton has a few megabytes of ROM devoted to its sophisticated (and large) operating system; the Zoomer, by contrast, runs GEOS, an operating system developed by GeoWorks, which is very compact yet quite powerful as well.

GEOS by itself is a very nicely built operating system; written originally for the Commodore 64, it was later ported to the IBM PC and is therefore well suited for handheld applications because of its compact RAM footprint.

Included with the Zoomer are a scheduler application; a notepad application; Pocket Quicken (a handheld version of the popular personal finance program); a calculator; a dictionary; a "form calculator" with built-in "forms" for doing financial computations and conversions; a world clock; a word-by-word language translator; a database of consumer, US, and international information; an interface program for the America Online service; three simple

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SocketLink EA and EA+ NE2000-compatible PCMCIA Ethernet cards
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games; and a file manager. This is in contrast to the Newton, which essentially comes with just a clock, notepad, address book, and scheduler application.

The address book allows for both text and handwritten information, so you can, for example, draw a map and store it with the address. The date book includes six month, one-month, one-week, and one-day views; it's fully functional and also allows mixed text and graphics storage. The note book allows for a hierarchically organized table of contents and can contain mixed drawings and text. Pocket Quicken has a clear graphical windowing interface, much like the Windows version, and lets you keep track of multiple accounts, income, and expenses. The Zoomer includes a graphical file manager, much like the one in GEOS for the PC, which allows you to launch applications as well. Thus you can install new applications on the unit which will appear in the file manager, and can be launched from there.

The applications are well integrated using the GEOS operating system, and the user interface is fairly uniform between the different applications. There are some omissions, however; for example, in the address book, you can select the part of the book you want with the pen, but not with the built-in arrow keys.

Nevertheless, most things about the user interface of the applications are relatively intuitive, except that the poor handwriting recognition makes almost every application a pain to use. It is difficult to enter data into the address book. It's quite difficult to get the machine to recognize your handwriting for rapid note-taking sessions. In general, it seems to be better to store handwriting (instead of trying to use the handwriting recognition task to convert to text), because it's faster and less error-prone.

The unit ships with 4MB of ROM, 1MB of RAM, and runs under GEOS 2.0. Of that one megabyte of RAM, 350K or so is available for user information (as a RAM disk); the rest is used by the system to run applications. The batteries last about one hundred hours according to the manual, comparable to other handheld devices such as the Sharp Wizard or the Casio B.O.S.S.

TO BUY OR NOT TO BUY?

The bottom line here is: Is this unit useful?

I have to conclude that although the Newton has its flaws, and is a first-generation product, it is, in the end, actually useful (at least for some people), which it achieves only after including a state-of-the-art handwriting recognition algorithm and a fast RISC processor. I'd personally say the Zoomer, by contrast, falls just on the other side of the line, in the realm of the not quite usable. The handwriting recognition is still just too slow and inaccurate for effective daily use. If you don't mind storing your information as scrawled handwriting, then perhaps you could use this machine without too many problems; however, many things need to be converted to text, for text searches and the like.

I wouldn't buy one myself. Although the Newton isn't for everyone, it is possible to get a reasonable amount of work done with it. The Zoomer, by contrast, is so difficult to use using the rather poor letter-by-letter recognition scheme that it is, at least at first, rather too cumbersome and slow.

It's possible that if you trained yourself carefully, you could write clearly enough to get sufficiently high recognition rates to satisfy your needs. However, this doesn't seem easy to do, given the difficulty several of us had trying to use this unit. Though the GEOS operating system itself is quite nifty and the applications generally seem to be well designed and well written, the

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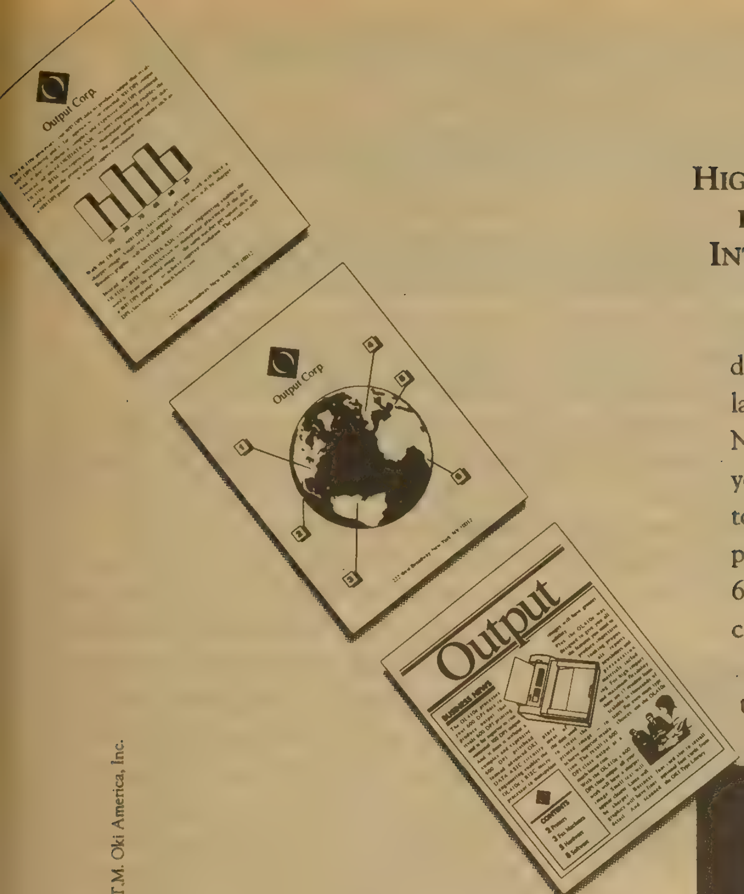

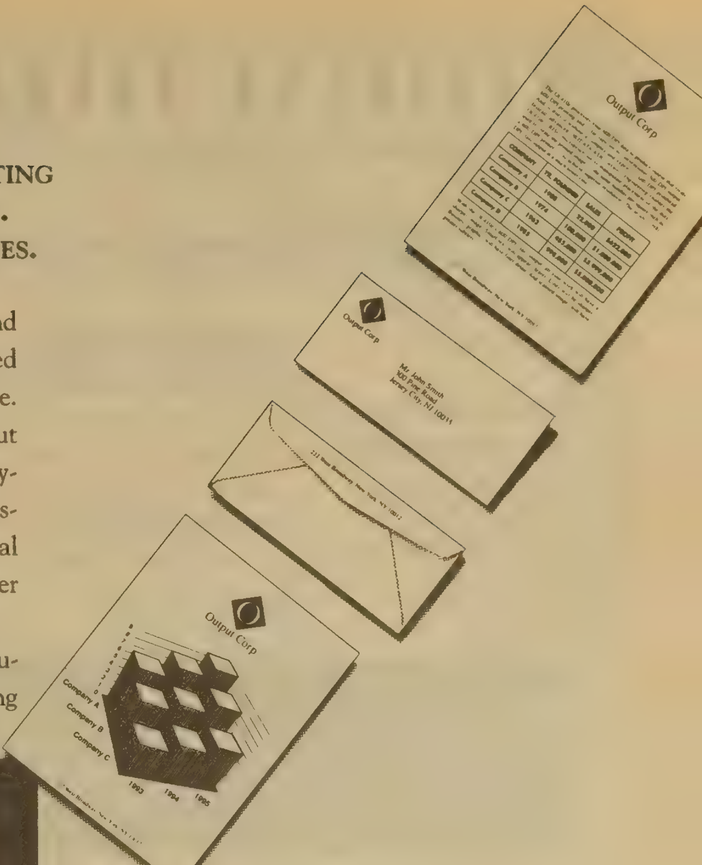

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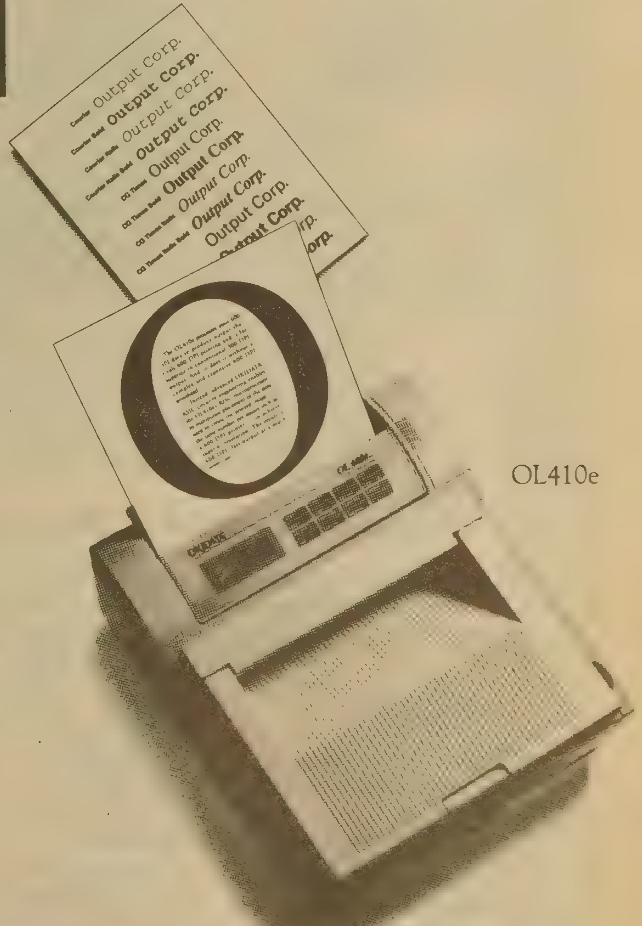

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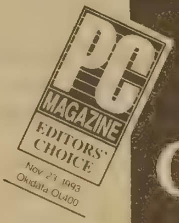

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handwriting recognition problems overwhelm this.

IN OTHER NEWS

•PC and Mac File Sharing for Zoomer
Palm Computing has announced PalmConnect, a set of connectivity software tools for linking Zoomer PDAs to IBM compatibles and Macintoshes. This software will allow the Tandy/Casio Zoomer to back up and exchange information with desktop PCs. Data transfer to and from personal information management software (PIMs) and palmtop organizers such as the Casio B.O.S.S. is supported. PalmConnect will retail for $129 for the IBM PC version. The Macintosh version will be available early this year, but pricing has not yet been determined.

•Day-Timer™ Software for Newton
Slate Corporation has announced that it is shipping the Day-Timer Meeting & Expense Pack for the Apple Newton. This includes expense tracking and meeting agenda/scheduler software, and is fully integrated with the other MessagePad applications such as the Calendar. The software is available on disk for $129, and can be downloaded to an Apple Newton via the Newton Connection Kit from Apple.

•40MB Flash RAM Card
SunDisk Corporation is the first to introduce a 40MB PCMCIA flash disk card, the SDP5A-40. The formatted capacity is 41.9MB, which can be doubled to 80MB using the compression software that is included with the card. The card is guaranteed for two hundred thousand cycles of write/erase cycles per sector, which means it can be used for up to two hundred thousand repeated writes before it's in danger of "wearing out." Using SunDisk's built-in "wearout-leveling" algorithms to evenly distribute wear across the card, it is expected that more than sixty years of heavy Windows use would be required before the card would have any endurance-related difficulties.

•NE2000-compatible PCMCIA Ethernet card
Socket Communications, Inc. has released its SocketLink EA and EA+ Ethernet cards, the first specially designed for the HP Omnibook 300 sub-subnotebook PC. The SocketLink EA card handles 10BaseT Ethernet, and the EA+ handles 10BaseT and 10Base2 communications.

The OmniBook, when hooked up to one of these cards, has drivers for Novell NetWare, NetWare Lite, Microsoft LAN Manager, IBM PC LAN, Artisoft LANtastic, Banyan VINES, and other networks. The cards are also capable of emulating the popular Novell NE2000 Ethernet card, allowing you to use standard, off-the-shelf NE2000 drivers for the card. The card includes a 64K buffer for fast operations, comparable to an ISA bus Ethernet adapter. According to Socket, the adapter runs up to four times faster than LAN adapters, which use the parallel port of the OmniBook. The EA card will retail for $399, and the EA+ for $420.

•PCMCIA SCSI card
The New Media Corporation has announced the Visual Media SCSI PCMCIA card. The card ships with New Media's ASPI manager and CorelSCSI v2 software, allowing users to configure the card via software, without having to set jumpers or switches. The card supports data rates of up to 200% that of parallel port SCSI adapters. The card is compatible with Windows NT and the MPC standard, and supports SCSI II. The card will retail for $339 including the CorelSCSI software. ■

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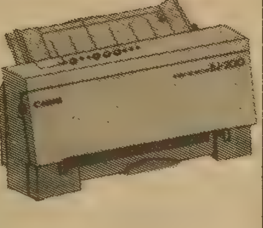

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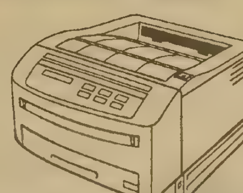

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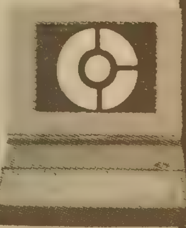

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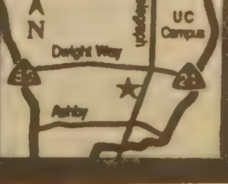

Canon's Portable Printer

The New BJ-10sx Bubble Jet Printer Offers Portability And Flexibility

BY ED KAHN

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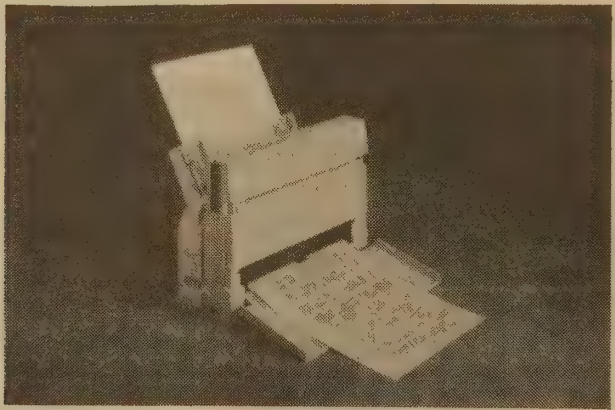
LAPTOPS

Not very long ago, to print good quality documents, you needed a laser printer. More recently, users are finding that bubble jet printer technology offers a good high-quality printing alternative. While a laser printer may still be preferable, on-the-go users do not always have that option. Fortunately, there are several lightweight, portable bubble jet printers that get the job done almost as well.

The BJ-10sx is Canon's most advanced portable printer to date. This is an excellent printer for those who need portability and flexibility. The basic printer can be used with either the included AC power supply or an optional rechargeable battery pack ($50). The battery pack can print about forty pages before it needs recharging.

The BJ-10sx measures about 9" x 12" x 2" and is small enough to fit nicely inside a briefcase. It weighs 3.7lbs., excluding the AC adapter or the battery pack, which add an additional 9.9oz. To print a single sheet, simply raise the cover and drop in the paper. The printer works at 110cps, whether you choose the high-quality or economy mode. I definitely like its simplicity. While you can control a number of things from the front panel and the dip switches, printing is as simple as inserting paper and telling your computer to print.



If you are also using this printer at home, you may want to buy the optional cut sheet feeder ($90), which holds up to fifty sheets of paper. The feeder is almost the same size as the printer itself, but weighs only 2.9lbs. When you use the BJ-10sx with its cut sheet feeder, the unit takes on a whole new look. You turn the printer on its edge and attach the feeder to what had been its bottom. The printer now sits vertically. Paper is stacked in the feeder at the back of the printer. Operation is simple and painless. Loading a stack of paper is easy, and the paper feeds out the front of the machine onto a table or desk.

WHEN YOU USE THE BJ-10SX WITH ITS CUT SHEET FEEDER, THE UNIT TAKES ON A WHOLE NEW LOOK. YOU TURN THE PRINTER ON ITS EDGE AND ATTACH THE FEEDER TO WHAT HAD BEEN ITS BOTTOM.

Other portable printers do a good job, but often require some compromise. I was not forced to give up any of the features I want in order to use this unit. Envelopes are fed from the bottom or back, depending upon whether you use the cut sheet feeder or not. Although only #10 size business envelopes will work, they load simply and print well. I found that envelopes are as easy to feed into this printer as any other small printer.

This printer is designed to be used with computers running Windows 3.1. The documentation instructs you how to install the proper driver into Windows. This part was pretty straightforward and simple. But I had to do a fair amount of experimenting to find a typeface I liked and to tell the Windows setup that I wanted 360 x 360 resolution in order to get the quality that approaches laser output.

Bubble jet technology offers excellent quality, but there are a number of variables that can affect your output. Paper quality is especially important. Paper that is too absorbent yields pages on which the ink bleeds. When you look closely, you will see uneven edges to the letters. On a bond paper with at least 25% cotton content, print quality will be excellent.

For users who are not working in the Windows environment, the BJ-10sx works with other printer drivers, including several of the most popular IBM and Epson models.

Bubble jet technology relies on a print head that sprays tiny dots of ink onto the paper or transparency. The BJ-10sx uses an ink cartridge ($25) that can print between four hundred and five hundred pages in high-quality mode and twice that number in economy mode. The ink, by the way, is waterproof. This is a feature I really appreciate after having too many envelopes smeared when I leave them out for the mail carrier. Cartridges are literally a snap to replace.

A 37K buffer assures that the printer will free your computer up as soon as possible so you can get on with your other tasks. The documentation that comes with the printer is excellent. If you simply want to know how to connect your computer to the printer and get on with the printing, the *Quick Start Guide* will get you going in minutes. If, however, you want to know the details of how the system works and what the cable pins control, you can find this information in the *User's Manual*. Everything is explained in simple terms, and a glossary tells you the meaning of most of the terms used. I did notice, however, that dithering is not in the glossary. Oh well.

This Canon BJ-10sx printer comes with a two-year warranty. If you want a printer to take on the road, this is a good model to consider. It also works well for everyday use if your printing volume is moderate. ■

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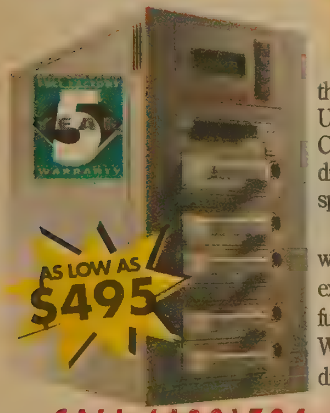

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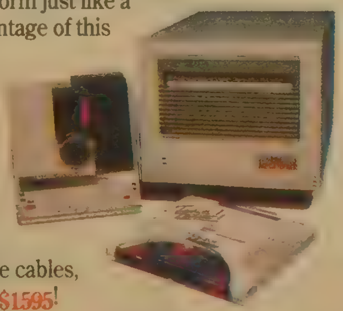

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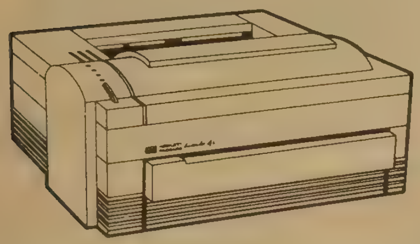

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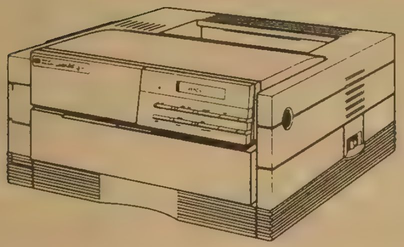

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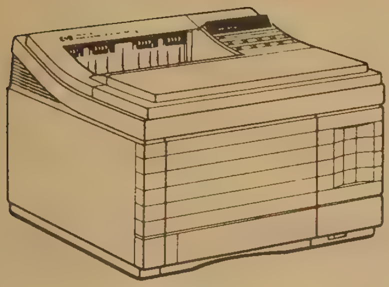

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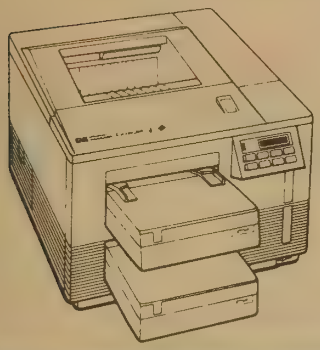

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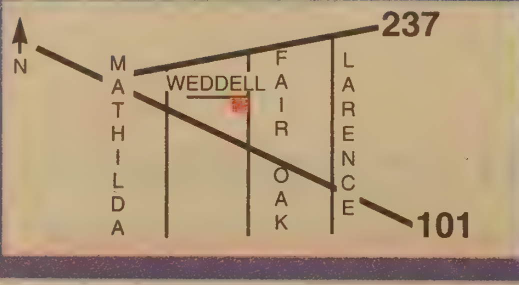

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LAPTOPS

COMPUTER OF THE MONTH:

The NCR 3150 Active Matrix Color

AT&T was not the first company to jump into the laptop market, but when it did come out with its initial offering, it made a big splash. It was set apart from the rest of the field by distinctive design and a module of software products that put an emphasis on communications, including fax and email. Now, with NCR well absorbed into the AT&T family, laptops are being introduced under that name.

Their newest lightweight computer is a beauty. AT&T's current line of portables includes a high-end machine that is actually made for them by NEC and is virtually identical to the NEC Versa series except for a few modifications. The NCR 3150, an entry-level model, comes in three configurations: monochrome, passive matrix color, and active matrix color. This month I am evaluating the active matrix color model.

Not very long ago, there was a significance between active and passive matrix displays. Both the gap in quality and the price differential are closing rapidly. Nowadays, you will pay only a couple of hundred dollars more for an active matrix display. The display on the 3150 is top of the line and gorgeous. Except for size and if you need Super VGA, there is little need for an external display. The 9.5" screen (measured diagonally) provides a VGA display that I can work on all day with no eye strain. The computer uses local bus technology, which gives fast video response and makes the system perfectly suited for Windows. And, by the way, if you purchase the monochrome model, it can be upgraded at a later date to a color display.

RESOURCES:

NCR 3150 Notebook Computer, $2025–$3845

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There are many things besides the brilliant color to like about this notebook, but before I get lost in hyperbole let's get the basics out of the way. The 3150 is powered by an 80486SX-25MHz central processor. It comes standard with 4MB of RAM, but is expandable by an extra 4MB ($245), 8MB ($460), or 16MB ($1905) through the addition of user installable memory cards. An 8K cache also gives extra speed to the system.

The hard drive is removable, which means you can select from an 80MB, 120MB (extra $100), 170MB (extra $200), or 250MB (extra $400) drive and easily upgrade at any time. A 3.5" floppy drive is also included with the system. The 3150 weighs 6.2lbs. and measures 11" x 8.5" x 1.9".

YOU CAN BUY LESS EXPENSIVE PORTABLES, BUT THIS IS DEFINITELY A CLASSY COMPUTER LOADED WITH FEATURES AND FLEXIBILITY.

The keyboard is as good as you can expect from a machine of this size. The port on the side of the 3150 will accept either a full-size keyboard, a numeric keypad ($75), or a mouse. NCR provides a trackball that attaches to the front of the unit and is convenient for on-the-go use.

A nickel metal hydride rechargeable battery comes standard and extra batteries ($225) are available. An extremely sophisticated power management system is built into the computer, and under optimal conditions you may get three or four hours of use from a fully charged battery.

The ports offer flexibility in the way you set up

continued on page 156

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Ergonomics For The Telecommuter

A Look At How Ergonomics Apply To Telecommuters Who Work All Day In The Workspace They Design

BY ROBERT MOSKOWITZ

Consider the telecommuter's situation. When working in the office, he or she is given a desk, lighting, furniture, and other elements of office design. Presumably, all these elements have been carefully selected, integrated, and installed with a wary eye on ergonomics. But when working at home, where ergonomic considerations are exactly the same, the telecommuter has none of these advantages.

According to Alan Hedge, professor of Human Factors & Ergonomics in the Cornell University Department of Design and Environmental Analysis, to ignore ergonomics while you work is to ask for disabling injuries. In fact, workplace ergonomics are one of only two areas that the federal Occupational Safety and Health Administration has targeted for emphasis in 1994.

Carpal tunnel syndrome, all by itself, is estimated to have cost about $27 billion last year in lost productivity and associated health costs. There are other costs and losses associated with entirely separate problems that can occur in a poorly put-together workplace—yes, injuries and problems can happen even to office workers who only sit and think all day.

Here, then, is a brief discussion of the basics of ergonomics, as they apply to telecommuters who must set up and make frequent use of a workspace on their own.

ERGONOMICS FOR THE TELECOMMUTER

The study of ergonomics is concerned with the interaction of people and the tools they use. It brings together many types of information to improve the workplace and the work. Applying the principles of ergonomics to your telecommuting workplace will make you more efficient and more healthy. In the last ten years, ergonomic specialists have established recommendations for workplaces, based on how your body works. They apply to wherever you work, whether in a central office, a satellite office, or your home.

"Ergonomic design" is a reflection and an implementation of these recommendations. But there are no labeling laws in this area. Many vendors use the words "ergonomically designed" more as a marketing gimmick than anything else. However, once you understand good ergonomic principles, you will generally be able to select safe, well-designed products and position them properly to help you do a better, safer job.

> **Once you understand good ergonomic principles, you will generally be able to select safe, well-designed products and position them properly to help you do a better, safer job.**

Recommendations For Seating—Whether you are typing, writing, talking on the telephone, reading, or meeting with a colleague, office workers spend most of their time sitting down. A well-designed chair is fundamental to good ergonomics and good health.

An ergonomically designed chair should first of all feel comfortable to you. It should be stable and firm. It should allow for relaxed and unrestricted movements as needed to accomplish your work. The chair fabric should "breathe" so your body can lose moisture to the air without you getting wet.

The chair should have a height adjustment so you can sit with your feet planted firmly on the ground. (If your feet do not reach the ground, obtain a solid footrest to give your feet support.) It should have a backrest adjustment (called a lumbar support) at least four inches high, which should be adjustable both vertically and front-to-back to give you firm support precisely in the small of your back when sitting comfortably. The chair backrest should tilt at least 20 degrees from the vertical to help you sit comfortably. Forward-tilting chairs that tend to shift your body weight onto your knees are generally not recommended for long periods of seated work.

Broad, padded arm rests are helpful, but should not interfere with the ability of the chair (when adjusted as to height from the floor) to slide under your desk or worksurface. Avoid bare metal arm rests.

You should be able to sit in your chair with your feet slightly forward, and in this position the front of the seat should not press hard against the backs of your knees or the undersides of your thighs.

Recommendations For Work Surfaces—An

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Robert Moskowitz is a business consultant based in Woodland Hills, CA, who writes frequently on productivity, office automation, and technology.

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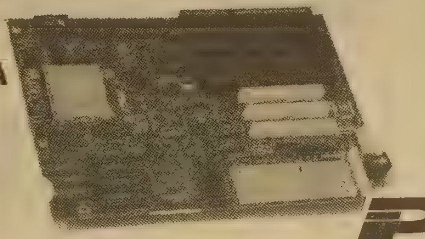

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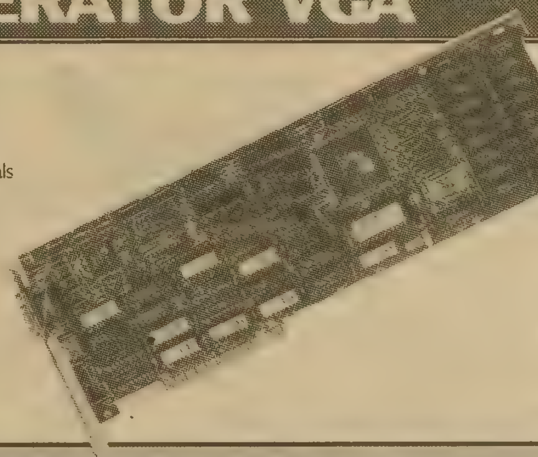

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ergonomically acceptable work surface must be large enough to accommodate the materials you normally use in your work. If you make semi-permanent piles of materials on your work surface, the surface must be large enough so there remains adequate clear area in which you can work.

For writing, the worksurface should be horizontal and 29"–30" above the floor. Its edge should be rounded to help you avoid circulatory and nerve-compression problems in your arms and hands.

For drawing, the work surface may slope up to 15 degrees from horizontal, if you wish.

For typing, the machine should be placed on a work surface 26" above the floor. A horizontal work surface is acceptable, but you are safer with a "negative slope" work surface—which flattens the angle of the keyboard and helps put the wrist in a neutral position. Intensive keyboard work can quickly cause musculo-skeletal problems ranging from discomfort to disabling injury for the wrist, arm, shoulder, and neck. Placing your keyboard at a working height of 29"–30" greatly increases the risk of developing such problems.

For computer-mouse work, make sure you don't have to stretch out your arm or raise your elbow to operate the device. Pointing devices are available in many designs, and for use with left hands or right hands, so get one that fits you comfortably.

> **Workplace ergonomics are one of only two areas that the federal Occupational Safety and Health Administration has targeted for emphasis in 1994.**

In general, keep all your immediate work organized directly in front of you in the area you can comfortably reach without stretching or twisting.

Recommendations For Computer Displays—Your display screen should be positioned at a height so you can see it comfortably without tilting your head too far up or down. Locate the screen so you needn't twist your head to see it. Set the screen at a suitable distance so you can read the display while sitting comfortably in your chair. Twenty inches is the recommended minimum. The farther away you position it, the less strain you place on your eye muscles. People over 40 may prefer a viewing distance up to 28".

Be alert to at least three types of glare that can cause problems with your computer screen. If you see bright reflections in the screen, they will disrupt your vision and eventually cause eyestrain problems. If you are not sure you are seeing reflective glare, get a small mirror and hold it in various positions on the screen. Reflective glare shows up as very bright light coming from the mirror. If you have reflective glare, adjusting the screen colors to provide dark characters on light backgrounds will reduce the chances of eyestrain.

When working in a room with generally too much light, you may experience veiling glare or discomfort glare. Check for veiling glare by holding a piece of typing paper to shield your screen from ceiling light, and then to shield your eyes from ceiling light. If you can see the screen much more clearly with the

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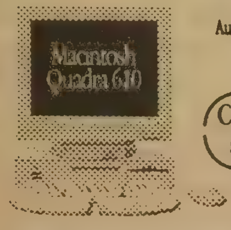

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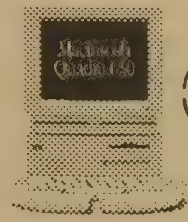

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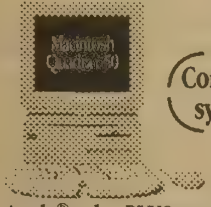

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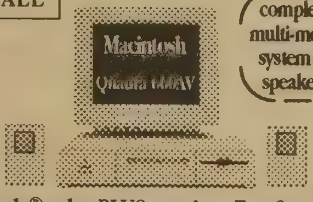

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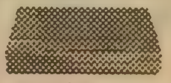

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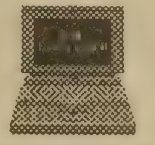

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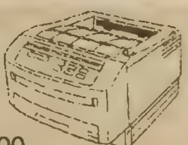

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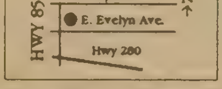

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26 4.0 Admin 31X Sys Mgr	27 4.0 Admin 31X Sys Mgr	28 4.0 Admin 31X Sys Mgr	29 4.0 Admin 31X Sys Mgr	

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				1 Applications Training
4 Net Tech 3.1X Sys Mgr	5 Net Tech 3.1X Sys Mgr	6 Net Tech NetWare Printing EVE 3.1X Sys Mgr	7 NetWare Printing	8 NetWare Printing
11 UNIX Sys Admin Applications Training	12 UNIX Sys Admin Applications Training	13 UNIX Sys Admin	14 UNIX Sys 3.1X Adv Sys Mgr	15 UNIX Sys 3.1X Adv Sys Mgr
18 UNIXWare EVE 3.1X Adv Sys Mgr	19 UNIXWare EVE 3.1X Adv Sys Mgr	20 3.11 to 4.0 UNIX Shell Program	21 3.11 to 4.0 UNIX Shell Program	22 3.11 to 4.0 UNIX Shell Program
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shield in place, you have problems with veiling glare or discomfort glare. Reduce these types of glare by lowering the overall room light level. Sometimes it's better to turn off the main lights and use a desk lamp or other task-oriented lighting. If necessary, try tilting or repositioning the screen.

If you try a glare filter, use a high-quality glass one which meets the American Optometrists Association standard. A micromesh filter, while less expensive, generally does not work as well.

Avoid positioning the screen so the front or back of the device faces a window. This position produces strong differences between the brightness of the screen and the surrounding visual field, and may eventually cause vision problems. If you must place your computer screen in this position, cover the window with a neutral color shade, preferably one similar to the background color of your screen. The best screen position is perpendicular to the wall with the window.

Recommendations For Environmental Heat And Noise—These are stress factors which, if allowed to contribute to your stress level, will induce you to: keep your muscles tense, make mistakes, tire more quickly, and be more prone to injury. A too-warm room makes you drowsy. A too-cold one robs your hands of their normal dexterity. Research shows that the optimum temperature for keyboard work is about 72 degrees. Eliminate irritating noise by such stratagems as closing the office door and windows, installing carpet or rugs, and placing printer, fax, or copy machines farther from where you work. If you can't eliminate noise, you can sometimes mask its stress-inducing effects by playing gentle music at low volume.

(That's some of the basics of ergonomics. I hope this gets you started toward having a safer, more productive office of your own. There's much more to know, of course, and I'll have more on ergonomics in a future column!)

FEDERAL FLEXIPLACE

Despite its relatively low profile in press coverage of telecommuting, the federal government is actively (some might even say "vigorously") pursuing the potential for telecommuting to significantly reduce the costs and improve the effectiveness of its millions of employees.

According to Marty Barrack, the information resource management policy analyst with the General Services Administration who is the point man for many federal efforts toward telecommuting (called FlexiPlace by the feds), the telecommuting trend is "way up."

"The forces driving us toward telecommuting are many," says Barrack. "The roads are more crowded. Air pollution is a big problem. The Clean Air Act Amendments of 1991 and other legislative initiatives are making telecommuting more desirable. On the opportunity side, you've got a growing interest in and acceptance of diverse work forces, and a far greater use of communications technology than ever before."

Here's a brief synopsis of Barrack's oft-given briefing on telecommuting:

What kinds of situations, jobs, employees, supervisors are suitable for telecommuting? The job should be portable. That is, it should be capable of being done outside the main office. It should not require any heavy manuals, little or no use of the library, few if any meetings. It's great if the work can be done from a computer terminal, using online references, and/or working alone.

The tasks should be quantifiable, or at least project-oriented. They should have well-defined milestones or deliverables that can be documented to show what the employee has actually accomplished, and when.

The pattern of contacts with others should be predictable. This allows the telecommuter to anticipate his or her communication needs and to know what equipment or resources will be required on any given day.

What kinds of employees are suitable for telecommuting? The person should want to telecommute. He or she should be a demonstrated "self-starter." If they're slow to get started when they're working in the office with others, they probably won't know how to work well by themselves.

Prospective telecommuters should be dependable and motivated. Most

continued on page 224

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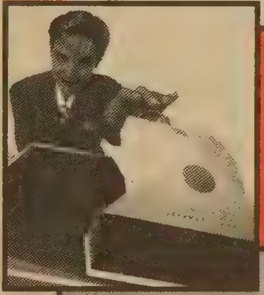

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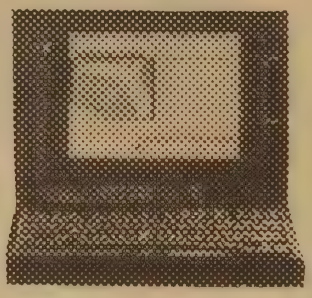

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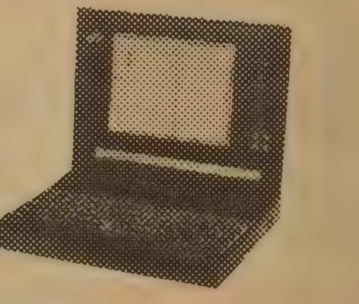

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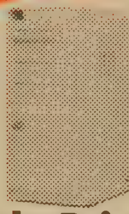

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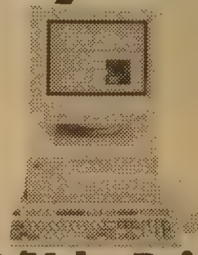

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Tax Update For Technology Professionals

New Laws And Regulations Affecting Software Developers, Programmers, Tech Writers, And Contract Engineers

BY DAVID SIMON, CPA AND JENNIFER R. CHERNISS

RESOURCES:

David Simon, CPA
Oakland
(510)893-5793

Proposed Treasury Regulations Section 1.174-2

Cox v. Commissioner
T.C. Memo 1993-326 (7/22/93)

Hefti v. Commissioner
Tax Court Memo 1993-128 (3/31/93)

Dunkelberger v. Commissioner
T.C. Memo 1992-723 (12/22/92)

Magee v. Commissioner
T.C. Memo 1993-305 (7/14/93)

Walker v. Commissioner
101 T.C. No. 36 (12/13/93)

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David A. Simon, CPA (M.S., Taxation) is in tax and accounting practice in Oakland and writes on a variety of business issues. His clients include professionals and businesses throughout the state. He can be reached at (510)893-5753. Jennifer R. Cherniss specializes in making boring technical information seem less so. Her writing services can be obtained at (510)893-5753.

The final 1099s landing in our mailboxes confirm that tax season is underway. For those wishing to be prompt in their worrying, this article reviews changes in the 1993 tax laws likely to affect programmers, contract engineers, software developers, and technical writers.

The potluck banquet of '93 tax modifications offers something for everyone—you'll especially want to be aware of the following news and reminders as you prepare your income tax returns and plan your strategy for next year.

QUALIFIED R&D EXPENDITURES

At the top of the list are recent proposed regulations defining what qualifies as research and experimental expenditures. Expenditures that qualify are treated favorably in that they can be currently deducted in the year incurred—even before the resulting product is brought to market. Also, expenditures meeting the definitional test of research and experimental expenditures may qualify for the valuable R&D tax credit.

In ancient times, the IRS would allow taxpayers to treat software development costs in a manner similar to that in which research or experimental expenditures were treated, which was good. But, ten years ago, a hungry government proposed regulations that would have imposed a host of additional conditions for the qualification of software development costs, even beyond those applicable to other products. Those bad news conditions served as guidance in related tax situations until recently.

New proposed regulations, issued last March, should be a boon to software developers. They reaffirm a favorable position from the good old days, removing major barriers that restricted many small fry from realizing important tax benefits. These rules, and their effect on software developers, are explained in a July 1993 *MicroTimes* article, reprints of which are available from my office.

BUSINESS EXPENSES

One happy taxpayer won a case last year that is bound to be good for a nickel or dime this spring. In *Cox v. Commissioner*, a husband claimed a Schedule C business deduction for one-half of the rent that he paid to himself and his spouse as joint owners of a building in which his business was located. The IRS had argued, unsuccessfully, that rent deduction was allowed only if the spouses file separate returns.

For programmers and other independent contractors seeking to reduce their self-employment taxes, this case suggests several possibilities for income shifting between spouses. For example, one spouse might rent an office in the home to the other spouse. Several traps await the unwary, however, so check with your tax adviser before trying anything bold or adventurous—that's the bean counter's department.

Should your innovative strategy fail, the Tax Court recently held that legal expenses paid to fight an IRS deficiency assessment are deductible as a business expense (rather than as an itemized deduction) if the tax issues involved relate to Schedule C deductions. Therefore, even if you're a sole practitioner, the cost of your tax defense can reduce not only your income taxes but self-employment taxes, as well.

EMPLOYEE BUSINESS EXPENSES

Congratulations to Judy Dunkelberger for making Silicon Valley tax headlines.

Dunkelberger is a CAD manager for Advanced Micro Devices, Inc. AMD, having drained its piggies defending its honor against patent claims brought by Intel, apparently felt they couldn't spare the change to reimburse Dunkelberger for costs of meals, parties, doughnuts, candy, and flowers that she purchased to boost the morale of employees under her supervision. The IRS wasn't all that generous either, disallowing among other things $112.12 she spent on flowers for an ailing employee. Dunkelberger sued Uncle Sam over those flowers.

The Tax Court allowed Dunkelberger to deduct the unreimbursed costs of business meals with vendors because she was expected to incur such costs as part of her job. But, while acknowledging "the often stressful business setting at AMD," the Court found that expenses such as flowers and internally consumed doughnuts didn't score a deduction because they weren't required as a condition of her employment. Moral of story: Better to work for Intel. In any event, AMD clearly needs the doughnut money to fund development of new microcode.

SMALL BUSINESS LOSSES

A common situation among freshly incorporated hi-tech start-ups is that they lose money. Suppose a software developer (or anyone else) decides to incorporate or to buy into a new corporation that loses money. A special rule (I.R.C. Sec. 1244) permits individuals to deduct certain stock losses as an ordinary loss, rather than as a capital loss. (The ability to deduct capital losses is severely restricted.)

But if you're a holder of such shares, watch out. In a low-down miserable blow, one taxpayer was denied this favorable treatment because, even though all the other requirements were met, he failed to attach a statement to his return setting

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forth such facts as the address of the corporation issuing the stock. This is something TurboTax and its ilk doesn't check for you—not like your kind, human tax preparer.

OFFICE IN THE HOME: THE SOLIMAN TEST

The US Supreme Court hates hearing even the most important tax cases, and I doubt it will decide another one involving the deductibility of an office in the home before polar bears breed at the Florida Keys. Unfortunately, the damning 1993 decision in *Commissioner v. Soliman* will likely be the defining case for about that long.

The Court ruled that Soliman, an anesthesiologist, was not entitled to deduct the expenses of his in-home office, because it failed to meet the requirement of being his "principal place of business." Soliman saw patients in hospitals but otherwise conducted his practice at home. Despite the comparatively little time spent at each hospital, the Court considered them, not the home, to be the principal places of business, since that's where services were actually delivered.

Should your innovative strategy fail, the Tax Court recently held that legal expenses paid to fight an IRS deficiency assessment are deductible as a business expense (rather than as an itemized deduction) if the tax issues involved relate to Schedule C deductions.

The implications are especially great for the many technology professionals working out of their homes, because special restrictions, known as listed property rules, apply to computers. These rules state that a computer is listed property unless it is used at a regular business establishment (which may include an office in the home). Listed property cannot be expensed in the year of purchase, nor may an accelerated depreciation method be used for it. The availability of rapid write-offs may thus depend upon whether or not a home office meets the strict IRS definition as such.

But don't believe those rumors flying around about home office deductions being history. Although Soliman clearly represents a victory for the government, my bet is that software engineers, developers, and programmers are among the few groups in a position to escape the wrath of Soliman, because, arguably, the place that these folks provide their services is wherever the monitor and keyboard is situated—i.e., where the programs are written.

The Soliman decision still makes home offices potentially easy prey for IRS auditors. To protect your deduction, you should review and perhaps modify any contracts on which you're working, and document your contractual understandings as to comparative importance of the functions performed at each location.

TRAVEL FROM HOME OFFICES

Whether or not an office in the home qualifies as such might also determine if the costs of traveling from the home office to other regular business locations are deductible as business travel, or are nondeductible commuting expenses. Application of the new Soliman standard on this issue is now being tested by lumberjacks, with obvious ramifications on other hackers.

In the Walker case, a lumberjack's home office flunked the Soliman test. The IRS argued that the lumberjack could therefore not treat the costs of traveling from his home to his wood-chopping site as business travel. They lost. The Tax Court found Walker's home office to be a "regular" place of business (though not the principal one) and the cost of his travel was therefore deductible.

This case suggests that if you do programming or tech writing in your home, you can deduct mileage for business-related trips, even if your home office isn't deductible.

There's an additional benefit tucked in there for those owning, rather than renting, their home. When you claim a deduction for an office in the home, a portion of the home is converted from a personal residence into business property. The converted portion is then ineligible for special tax benefits conferred on your residence, such as tax-free rollover of gain into a replacement residence or the once-in-a-lifetime exclusion of gains on sale of a principal residence. Under this new standard, you can now take a deduction for travel from your in-home place of business without electing to claim an office in the home.

COMPUTER EQUIPMENT EXPENSES AND SECTION 179

A deduction is provided for those electing to treat the cost of certain business property, including computer hardware, as an expense rather than a capital expenditure, which must be depreciated over several years. The 1993 Tax Act retroactively

continued on page 156

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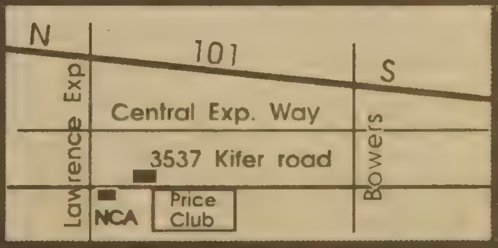

The Power Of Internal Contracts

Doing Business In A Businesslike Manner

BY N.D. MEYER

How much time does your management team spend sorting out misunderstandings between the IS staff and their clients, and clarifying accountability for projects and services? If your answer is "too much," the remedy may be internal contracts. A few minutes at the beginning of every project spent negotiating clear agreements with your internal customers and suppliers can save many hours of confusion and dispute later in the project, greatly enhancing customer satisfaction and teamwork.

> Every **relationship** within an organization can be described as a **contract**.

Every relationship within an organization can be described as a contract—be it between the IS department and clients, or between groups within the IS department (i.e., "subcontracts"). By "contract" we do not mean an extensive legal tome. Also, we do not mean to imply that money changes hands. Rather, a contract is an agreement which states the fundamental elements of a business understanding. Contracts clarify promises, mutual expectations, and accountability.

A true story illustrates the risks of working without a contract.

An IS department was having repeated disputes with its client over a very large project. When they met (midway through the project) to clarify the contract, they found three discrepancies:

1. The IS department thought it was selling a product called a "developed solution." As such, they felt the client was "out of line" when they tried to tell the IS professionals how to do their job of designing the system.

2. The clients thought they were buying a product called "expert time." As such, they wished to lead the project team and retain control of key design decisions.

3. When things went wrong, each group switched their position! The IS group claimed that the client mismanaged the project, implying that they were just selling "expert time" and that they had completed their obligations by doing what the client told them to do, since the clients were really in control. Meanwhile, the client claimed that IS was at fault, implying that they were buying a "developed solution" and held IS accountable for the end result.

In this example, the client was given a choice of the two products: a developed solution (where IS runs the project and is accountable for results), or expert time (where IS works under the client's direction and the client is accountable for results). Clients are not allowed to "have their cake and eat it too."

To resolve the conflict, the client opted to buy a "developed solution" and avoid the risk associated with managing the project themselves. IS, of course, agreed to involve the clients on the team, but retained control of the project.

There are numerous benefits to the businesslike practice of contracting.

Contracts with clients avoid many communications problems that are at the root of client/IS department strife. Accountability and authority are unambiguously placed and "finger pointing" disappears, enhancing partnership. Explicit accountability greatly improves customer satisfaction by ensuring clear communication and consistent mutual expectations.

The discipline of clear contracting with clients also avoids the "creeping scope" syndrome—an endless series of changes in requirements midway through a project. Each change should warrant a revision of the contract. If the contract is not explicit, the IS department may find itself facing huge project overruns as it chases a moving target.

Contracting gives managers a tangible medium for coaching people on what makes for a healthy project. Intuition and experience both suggest that large systems development projects should be avoided whenever possible. The contracting stages gives managers a chance to step in and review projects before commitments are made.

Clear contracts also help managers with their resource management challenges, by making explicit exactly what their commitments are.

Perhaps most importantly, teamwork throughout the IS department is greatly enhanced. In the past, people felt that they had to "own the bodies" to be sure needed work was done, often because they felt that they couldn't trust the other group to satisfy their needs. This isolationism led to replication of expertise, which forced each group to become a jack of all trades and expert at none.

When a discipline of contracting is established, people need not have those with the necessary skills reporting directly to them. Instead, they can "buy" help from the appropriate group. As long as the culture demands that everyone deliver what they promised in these contracts, both to clients and each other, it is better to "hold contracts than own bodies."

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This article is based on material from Structural Cybernetics, *a study which presents an innovative new model for redesigning organizations and details a participative process of structural change. A complimentary brief summary is available to* MicroTimes *readers by calling NDMA at (203)431-0029.*

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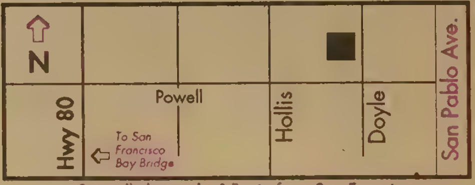

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HP NetServer 4d/66 LM
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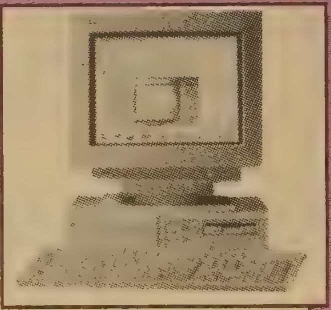

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- High performance for demanding network tasks
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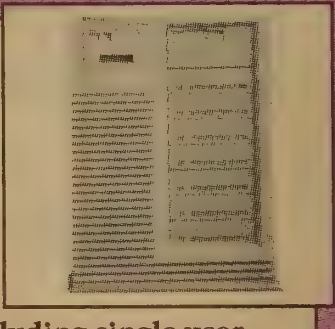

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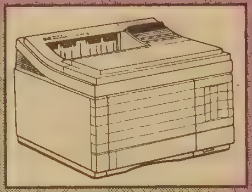

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$1849

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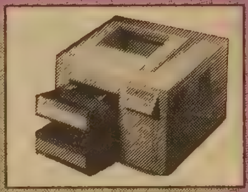

This 17 pages per minute, high-performance, 600dpi network printer offers the power & performance to meet users' expanding needs. Add interfaces, memory, paper-handling at any time.

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This high-speed, high volume, high-resolution laser printer is designed for multiple network environments.

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- Color PCL5 language and a slot for HP LaserJet typeface cartridges
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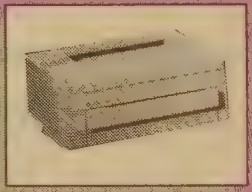
HP LaserJet 4ML



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- Up to 4 pages per minute
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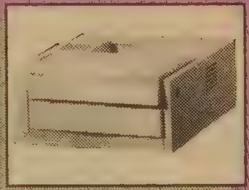

Remarkable 600-dpi resolution in an affordable, feature-rich, 4-ppm PostScript printer designed for Macintosh and Windows users. Its powerful RISC processor is boosted by PostScript Level 2 software from Adobe, 80 scalable typefaces, and 6MB of memory standard.

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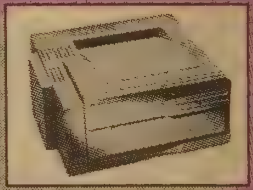
HP LaserJet 4P



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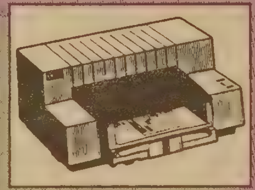
- **45 scalable typefaces**
- **Full range of expansion options.**

HP InkJet Printers For PC DeskJet 500/ 500C/550C



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- Extremely quiet operation
- 300 dpi printing

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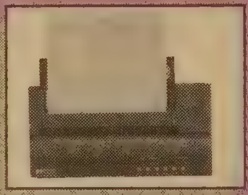
HP DeskJet 310 InkJet



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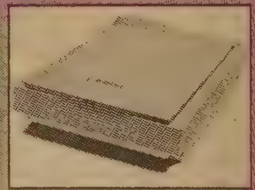

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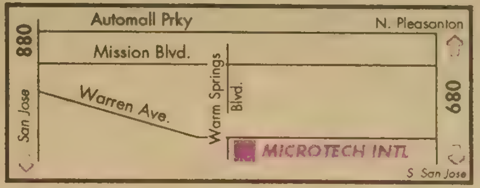

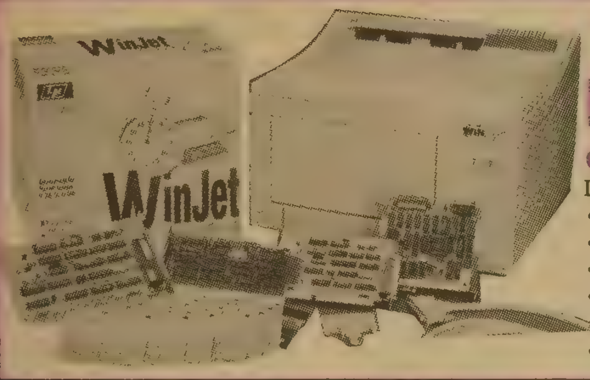

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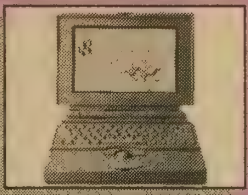

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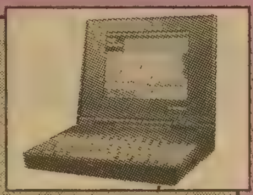

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A contract is comprised of the following elements:

- The name of the customer. The customer may be a consortium if an identified group of customers wish to share the purchase of the product. However, "the whole corporation" is not a legitimate customer, since it is logistically impossible to get everyone to agree to all of the details of the purchase.
- The name of the supplier.
- The name of the product and its key deliverables. A full description of the product (specifications of functional requirements, quantities, levels of quality, metrics of quality, etc.) should be attached.
- The delivery date. This means that a contract cannot be formed until the project receives a priority and a start date is scheduled; prior to that time, the project is expressed as a proposed contract ("proposal").
- The price (or at least direct costs and level of effort) and the terms (e.g. fixed price versus time and materials).
- The customer's responsibilities (e.g. we can only meet this commitment if the customer does this...). If the customer must supply information, resources, acceptance testing, or time, these responsibilities and the due dates should be clearly specified in advance.
- Assumptions about other dependencies that are outside of the control of the group issuing the contract (e.g. we can only meet this commitment if the world does this...).
- Necessary administrative information such as the customer's budget center, the supplier's department number, a contract number for tracking purposes, and both parties' signatures.

Since a contract represents a purchase decision, the following rules of contracting should be followed:

- If a project requires multiple purchase decisions, it should be represented in multiple contracts. For example, if a client wishes to buy a new application and an upgrade to her PC, and neither is necessary to deliver the other, then these are two separate purchase decisions and should be represented by two contracts. On the other hand, if the PC upgrade is required to run the application, a single contract (perhaps with an internal subcontract) should be issued.
- If no purchase decision is required, no contract should be issued. For example, IS should not issue a contract for every telephone call that comes in.
- A contract for a service that is provided on an ongoing basis over a period of time is termed a "service-level agreement." For example, annual service-level agreements may be issued for applications processing and support.

Service-level agreements may only be used when the purchase decision is made once for the entire period of time—that is, if they can specify in advance the product, quantities, and quality factors.

- For products that are sold automatically to everyone, such as the "account executive" service, a contract may be assumed once a standard contract is drafted and the marketplace is reasonably well educated about the product.
- A contract must be by mutual agreement. A group cannot be forced to sell products it does not wish to provide, or

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November 1993, January & February 1994

Late Breaking News!

The *NETiS N433VL* and *N4D266VL* systems are ranked #1 and #2 respectively in the PC World's Top 20 PC list, February 1994.

"Service and support are decent, with responsive, accurate tech support ... (*NETiS N433VL*) with reasonable performance and feautres that should last a few years."

- PC World February 1994

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"The *NETiS N4D266VL*'s fine performance, low price, and super support make it the hands-down winner for top overall Best Buy"

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"The Best Buy system from *NETiS* Technology represents a remarkable combination of low price and high performance."

- PC World November 1993

#1 in the PC World Top 20

N433VLBESTBUY

- ☐ Intel 486DX-33 CPU with cooling fan
- ☐ 8MB memory, 128KB cache
- ☐ 3 VL-Bus (VESA Local Bus) slots
- ☐ **Pentinum-ready ZIF socket**
- ☐ 250MB hard drive
- ☐ **32-bit VL-bus IDE controller**
- ☐ 1.2MB or 1.44MB TEAC floppy drive
- ☐ **Genoa VL-Bus Graphics with 1MB**
- ☐ 14" SVGA color monitor, .28mm
- ☐ 2 serial/1 parallel/1 game port
- ☐ 101-key keyboard
- ☐ Desktop case with power supply

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- ☐ 3 VL-Bus (VESA Local Bus) slots
- ☐ **Pentinum-ready ZIF socket**
- ☐ 250MB hard drive
- ☐ **2MB VL-bus caching IDE Controller**
- ☐ Both 1.2MB & 1.44MB TEAC floppy drives
- ☐ **Genoa 32-bit VL-Bus Graphics w/1MB**
- ☐ **14" non-interlaced .28mm SVGA color monitor with LED display (1280x1024)**
- ☐ 2 serial/1 parallel/1 game port
- ☐ 101-key keyboard & mouse
- ☐ Desktop case with power supply

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with 486DX-33CPU	**$1,498**
with 486DX2-50CPU	**$1,518**

OPTIONS for *N4D266VL POWERSTATION*:

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340MB IDE hard drive	Sub	$45
420MB IDE hard drive	Add	$135
540MB IDE hard drive	Add	$275
Orchid Celsius VLB w/2MB	Add	$179
Diamond Viper VLB with 2MB	Add	$260
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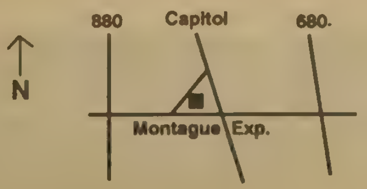

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Tel: (408)263-0368
Fax:(408)263-4624
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commit to a deadline involuntarily. Similarly, one IS group cannot commit its subcontractors (i.e. other groups within the function from whom it buys components or support) without their permission.

- If a customer changes jobs, it cannot be assumed that his or her successor agrees to the contract. The contract should be considered void unless the successor explicitly agrees to continue the project.

It is good business practice (although not absolutely necessary) to make contracts explicit, in writing. This may take the form of simple memoranda of understanding, or confirming messages.

Signatures on contracts are generally desirable. However, if this is counter to the corporate culture, the supplier can still draft a contract and send it to the customer for verification.

Once a contract is agreed, it should be held inviolate. Contracts are not the same as a "backlog" or "to-do list," but rather a solid commitment to deliver a product on time. Therefore, people must never issue contracts (i.e. make commitments) that cannot be fulfilled. It is always better to say no in advance than to say yes and then later disappoint the customer. By saying no in advance, IS staff will not promise things they cannot deliver, and therefore will gain a reputation for reliability.

To establish the discipline of contracting, a starting date is selected. Thereafter, the department must document every new commitment in the form of a contract or internal subcontract.

Then, each individual analyzes his or her prior task assignments and clearly documents every existing contract with clients. (This generally amounts to an average of between one and two contracts per person.) Contracts are documented only for commitments, not for the entire backlog or clients' wish-lists.

Clients are consulted to verify the IS department's understanding of each commitment. Generally, clients' response to clarifying accountabilities are very positive.

After contracts with clients are documented, contracts and subcontracts should be defined between groups within the department.

Only after all contracts—including those within the department—have been identified can a group assess its total workload. Then, each group must renegotiate expectations if necessary. This is especially problematic if the department has a history of committing to more than it has resources to deliver.

Some people may be concerned that contracting brings unnecessary paperwork. But once the discipline is established, contracts take very little time—far less time than is required to arbitrate later misunderstandings. And the alternative—a lack of clear agreements—risks loss of faith when people fail to deliver on perceived promises. Also, collaboration unravels when groups find they need to own headcount because they cannot trust each other as subcontractors. Finally, loss of management control over resources occurs when a group's commitments are unclear and difficult to manage.

We consider contracting an essential ingredient of a customer-focused, team-oriented, high-performance IS organization. ■

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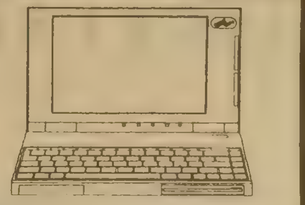

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continued from page 32

BELL ATLANTIC/TCI AND BEYOND

We may all get lucky in the sense that the architecture of consumer broadband networks winds up following a model that resembles the Internet in its openness and decentralization. This appears to be the general direction Bell Atlantic is taking. However, while their system is open (in terms of common carriage or system architecture), it is heavily asymmetrical, with a big downstream pipe and a small upstream pipe, at least for the foreseeable future.

> As a pragmatist I believe that government action, or certainly the threat of it, may be useful or, in the worst case, necessary, to achieve the desired end.

If the TCI merger goes through, and if they are able to rationalize two different networks, business models, and corporate cultures, what obtains for BA will hold for TCI too. There are some mighty big ifs here, and in any event Bell Atlantic/TCI only serves 25% of the country. Other carriers, who have a different business model that does not emphasize revenue from transport, *a la* Bell Atlantic, but revenue from content, may choose to go with closed, channelized systems.

We have to see what other cable companies and telcos actually offer. The pragmatic question that faces us will be what, if anything, can be done to nudge the system into providing alternatives closer to open platforms.

All in all, I'd prefer to try to catalyze any necessary changes in mindset of carriers in order to secure voluntary moves. But as a pragmatist I believe that government action, or certainly the threat of it, may be useful or, in the worst case, necessary, to achieve the desired end. Further, since the whole process is already highly politicized, I think involvement to prevent bad governmental solutions from being imposed and screwing things up is clearly necessary. Thus politics is inevitably involved to carry out an anti-authoritarian mission. At least in my view. ■

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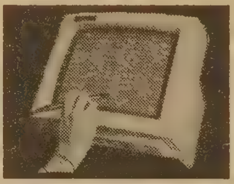

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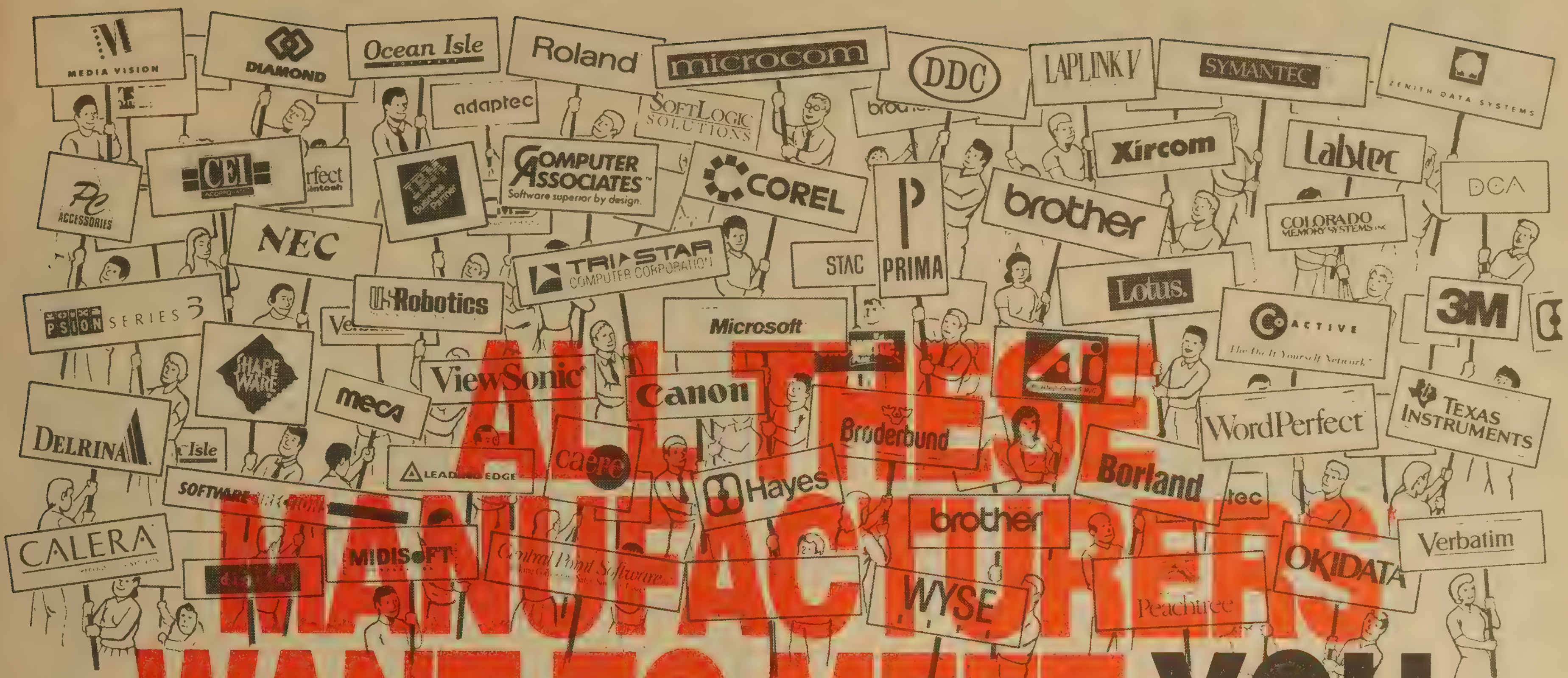

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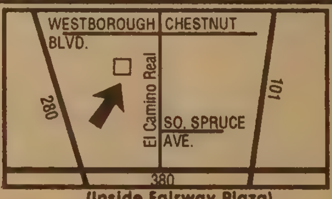

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Diamond SpeedStar Pro ISA w/1MB	110
Diamond SpeedStar Pro VLB w/1MB	110
Diamond Stealth 24VESA Local bus w/1MB	150
Diamond Stealth Pro VRAM w/1MB/2MB	240/300
Diamond Viper VESA Localbus w/2MB	355
SPiDER 32VESA Local Bus w/1MB/2MB	93/143
SPiDER 32VLB Plus w/1MB/2MB	100/150
SPiDER BlackWidow VLB w/1MB/2MB	180/230
SPiDER BlackWidow Engine ISA 1M/2M	170/220
Orchid Farenheit 1280Plus w/1MB	145
Orchid Farenheit Localbus w/1MB	145
Orchid Celsius 1MB/2MB	220/270
ATI Graphic Ultra Pro ISA w/2MB	300
ATI Graphic Ultra Pro VLB w/2MB	305
ATI Plus VLB 2MB DRAM	228
ATI Ultra Pro EISA w/2MB	340
ATI Graphic PCI w/2MB.	350

MONITORS

Nanao F550i 17"	$930
Nanao F550iw 17"/T560i 17"	1080/1560
Nanao F760iw 21"/T660i 21"	1950/2230
NEC 3FGE/ 4FGE	574/674
NEC 5FG	1280
NEC 5FGE/5FGP	1,045/1,260
NEC 6FGP	2,310
NEC 3V	530
MAG 15F-MPR (1280x1024,0.28)	490
MAG 17FG (1280x1024,0.26)	850
MAG LX 1564 15"	390
SONY CPD 1430s 14"	520
SONY CPD 1730/17SEI 17"	970/1,120
SONY GDP 2036s 20"/2038 20"	1900/2140
HITACHI CM-2095 20"/2087 20"	1220/1520
HITACHI CM-2187 21"	1860
HITACHI CM-1588MV	465
Viewsonic 4E/6E	264/280
Viewsonic 15E	380
Viewsonic 15/17	435/810
Viewsonic 20/21	1510/1730
KFC 15"/KFC 17"	410/700
Mini micro Intrl (1024x768) monitor 0.28	240
Mini micro Non-interlaced Monitor 0.28	250

CONTROLLER CARDS

IDE w/IO	$15
IO with 2s/1p/1g	12
VESA Localbus IDE	35
Orchid IDE VLB w/ IO	59
Promise IDE DC 200	98
Promise IDE DC420VL/4030VL	115/130
Adaptec SCSI 1522/1542C	80/175
Adaptect SCSI 1542CF/1542CF w/Kit	215/250
Adaptec SCSI 2742T/2742	325/295
Adaptect EISA SCSI 2742TK	355
Adaptect SCSI 2842 VLK	285
Ultra Stor SCSI 14F/24F EISA	190/350
Ultra Stor SCSI 34F VLB	250

PRINTERS

Panasonic KX-P1123/2023	$165/195
Panasonic KX-P1124i/1624	235/345
Panasonic KX-P2180/2123	155/215
Panasonic KX-P2124/2624	315/375
HP DeskJet 500/500C	295/395
HP DeskJet 550C	585
HP DeskJet 1200C	1374
HP IIIP/HP IV	845/1350
HP 4L/4M	665/1865

MISCELLANEOUS

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Fax Modem (9600 F, 2400 M)/Window	42
Fax Modem (14400 F, 14400 M)	120
US Robotics Modem 9600/14,400	144/148
US Robotics Fax/Modem 14,400	168
3-Button mouse	10
Microsoft mouse serial/bus	38/55
Logitech Mouseman serial (4000dpi)	38
Logitech Mouseman Bus (4000dpi)	55
Colorado Tape backup DJ-10 120M	98
Colorado Tape backup DJ-20 250M	158
Colorado Trakker 120MB	230
Colorado Trakker 250MB	330
Baby AT/Mini Tower case w/230W PS	45
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SMC plus Elite 8 bit coax	$110
SMC plus Elite 16 bit coax	120
SMC Elite 16bit combo	140
8bit Ethernet	40
16 bit Ethernet 10Base-T	45
16 bit Ethernet combo	50
3COM 8bit coax	170
3COM 16bit Etherlink II coax	180

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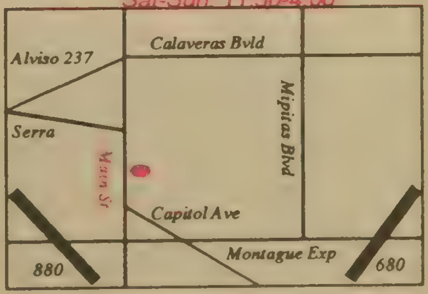

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NICE US Made 486DX-33MHz ISA VLB 256K	465
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Comet 386 40MHz 128K RAM Cache	170
Comet 386SX 25MHz with CPU	130

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Conner CP30174E 170MB 17ms	209
Conner CP30204 212MB 256K Cache 12ms	239
Conner CP30304 340MB 12ms	329
Maxtor LXT7131A 130MB 15ms	189
Maxtor LXT7213A 212MB 15ms	229
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14" Samsung Paper White VGA Mono Monitor	135
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Intel SatisFAXtion Model 200 14.4K/2400 Fax/Modem	185
Intel SatisFAXtion Model 300 9600/14.4K Fax/Modem	235
Intel SatisFAXtion Model 400 14.4K Fax/Modem	285
Intel SatisFAXtion Model 400e 9600/14.4K Ext. Modem	350
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GVC 14.400 V.32bis V.42bis Int./ Ext Fax/Modem	165/185
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ATI Ultra Pro EISA 2MB VRAM Video Adapter	409
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Diamond Stealth 24 VLB 1MB RAM Accelerator	175
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Diamond Viper VLB 2MB VRAM Video Adapter	379
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SummaSketch III 12x12 4 or 16 Buttons Digitizer	269

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2 Serial, 1 Parallel, 1 Game Ports Card	18
IDE with 2 Serial, 1 Parallel, 1 Game Ports	30
STB 2 16550 Serial & 1 Bi-Directional Parallel	65
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Kouwell IDE/FD 2 16550 Serial, 1 Parallel & 1 Game	75
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UltraStor 34F VESA Local Bus SCSI Bus Master	260
Adaptec 1522/ 1542C Kit SCSI Host Adapter	155/255
Adaptec 2742T EISA SCSI 32Bit Adapter Kit	375
Adaptec 2842VL VESA RISE SCSI Host Adapter	299
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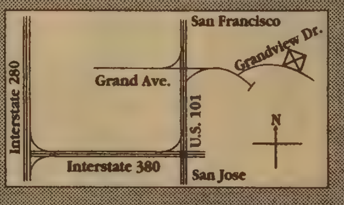

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4x8-70	155
4x9-70	165
4x9-80	155
4x9-60	170

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1x8-70 2 Chip	46
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512Kx36-70	102
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1x36-60	189
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DRAMS

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8Kx8-15	4.00
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NEC Silentwriter 90/290	99/124
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TI Microlaser 1 MB	55

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Model		P/N	
433P,33P,325P,33D,325D			
	1 MB	310-2505	$89
	4 MB	310-2507	169
433TE, 425TE & Powerline Workstation			
	2 MB	310-2466	$129
	4 MB	310-2467	189
	8 MB	310-2468	349
	16 MB	310-2469	669
Power Desktop 486D, D/33, D/25, D/20, D/66			
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	16 MB	310-2625	669
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- SIMMply RAM 159

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Dual Floppy 1.2/1.44	135
Heat Sink w/Fan For 486's/Pentium	12/20

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	4 MB	117081-003	189
SLT 286	4 MB	110237-001	325
LTE 386S/20	2 MB	12125-001	129
	4 MB	121125-002	225
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	4 MB	129769-002	245
	8 MB	129769-003	395
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	4 MB	107653-001	310
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	EBD	167811-001	225
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Deskpro 386S (E. Board)			
	4 MB	11364-001	255
	4 MB	112534-001	189
Deskpro 386/33L, 486/33L, 50/25			
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	8 MB	116561-001	365
	32 MB	116568-001	1475
Deskpro 386/20e, 25e (E. Board)			
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	4 MB	118690-001	345
	8 MB	128877-001	395
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	8 MB	141742-001	315
Prolinea 4/33	2 MB	141682-001	125
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	8 MB	141685-001	345
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	8/16 MB	389/699
T3300SL	2/4/6 MB	135/210/299
T3100	2 MB	135
T2200SX, SXE, T1000LE	2/4/8MB	135/210/379
T1800 Satelite	2/4/8 MB	135/210/379

NEC MEMORY

Prospeed 286, 386SX/16	1/2/4 MB	$125/185/269
Prospeed 386	2/4 MB	189/475
Prospeed SX/20	1/4 MB	125/249
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MAC PB 100	2/4/6 MB	89/179/239
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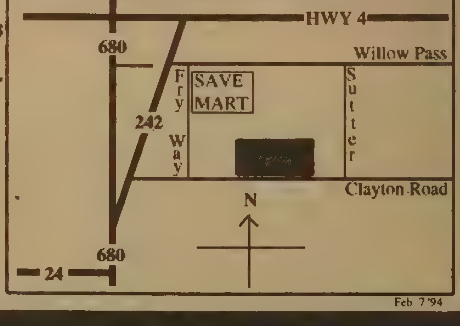

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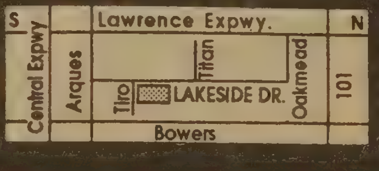

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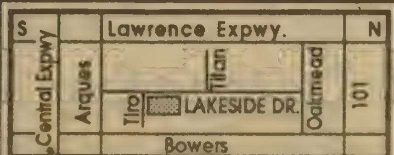

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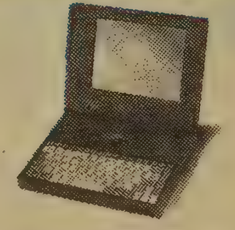

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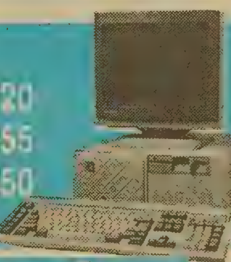

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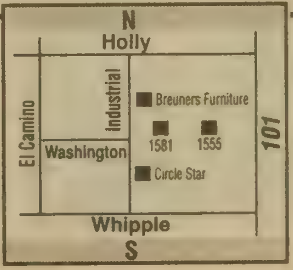

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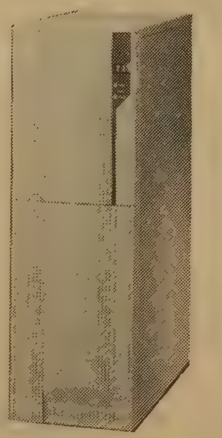

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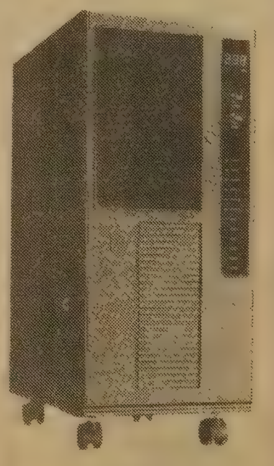

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ISA/EISA MOTHERBOARDS

286-12/20	$39/55
386SX-40	$64

THE STALLION SERIES

ISA 386DX-40 w/128k	$98
ISA 486SLC-25	$109
ISA SX25 128K/256K	$158164
ISA 486DLC-33/40 w/128K	$134/139
ISA 486SX33 128K/256k	$192/199
ISA 486DX-33/50 256k Intel	$355/515
ISA 486DX-40 256k AMD	$345
ISA 486DX2-50/66 w/256k Intel	$375/555
ISA 486DX2-66 w/256k AMD	$485
EISA 486DX-50 w/256k	$649

VLB/PCI MOTHERBOARDS

486/P24T

PLEASE ASK FOR GREEN PC 486 MOTHERBOARDS

MustangF 486SX-25 ISA/VESA	$185
MustangS 486DX-33/50 W/256K Intel	$365/525
MustangS 486DX2-50/66 W/256K Intel	$385/565
MustangS 486DX-40/66 W/256K AMD	$355/495
MustangT486-33/50/66	$405/565/605
IBM Alaris 486SLC2-66 w/wo Math-Co	$249/279
IBM BlueLightening 486BL3-75	$699
Micronix 486-33/50/66	$595/755/795
AMI S Voyager 486-33/50/66	$625/785/830
AMI S Voyager PCI 486DX2-66	$1129
Pegasus T 486-33/50/66 Eisa/Vesa	$565/725/765
Micronix 486-33/50/66 Eisa/Vesa	$685/845/885
AMI Ent IV 486-33/50/66 Eisa/Vesa	$755/915/955

PENTIUM P5-60 MHz

Capricorn T 512K VLB	$1355
HP-HCL Panther PCI/EISA 512K	$1655

ESDI CONTROLLERS

DTC	$127
Ultra 12C 1/4MB	$370

RAID Controllers in Networking Section

ISA/EISA CONTROLLERS

IDE/MFM/RLL & FAST I/Os

Mustang IDE 2FD-2HD/4FD-2HD	$12/26
Mustang IDE w/ 2SPG	$16
Promise IDE Caching DC200 2FD/4HD	$112
Promise IDE Caching DC2032 2FD/4HD,IO	$149
Ultrastor 15C IDE Caching (upto 8MB)	$195
DTC IDE EISA/HFC RLL Card	$135/20**
UltraStor 22F Caching EISA	$340
FAST-PIG IDE,IO/IO w/16C550 Uarts	$39/29
ULTRA-IO 4S/3P 4 16C550 Bi-Dir	$139

SCSI

Future Domain Comp 8/16 bit	$39/52
Trantor SCSI Adapter	$59
ADAP 1522 16BIT Card/Kit	$79/136
ADAP 1542C Card/Kit	$199/245
ADAP 1542C+ Kit	$310
ADAP 1742 EISA SCSI-2 Card	$249
ADAP 2742 EISA Fast SCSI2 C/K	$319/359
Bus Logic BT747S	$266**
BusLogic BT747S EISA Fast SCSI2 Kit	$395
DTC3292K..7HD&4FD	$349
DTC3290AS 7HD&4FD Caching	$486
Future Domain TMC1680 SCSI II C/K	$165/245
Forex VLB SCSI Card	$184**
Ultar24F EISA SCSI Card/Kit	$321/347
Promise DC2040 Caching(upto 16MB)	$215
AMI EISA SCSI II Caching 4-16MB	$499
DPT Smart CachePlus+EISA SCSI	$427
Mylex DCE EISA SCSI Caching Ctlr	$542
Trantor348 Parallel Port to SCSI	$179

VLB/PCI CONTROLLERS

IDE

Mustang IDE/IO	$24
Mustang IDE/IO Cach 4-16MB 15.6mb/sec	$129
DTC 2272 IDE / IO wo/Game	$60
DTC 2270/78 8.3MB/sec IDE / IO	$79/$39
Promise DC-4030 4HD/2FD Caching	$129

SCSI

DTC 3270 SCSI I	$119
Forex Bus-Master VESA,50Hz	$204
BusLogic BT445S Fast SCSI-II	$287
UltraStor 34F SCSI II 32k Card/Kit	$257/289
AMI SCSI II Caching 4-16MB DOS/OS2	$394
ADAPTEC 2842 SCSI II Kit	$289
National SCSI PCI Controller	**$199**

Cases - Power Supplies - KeyBoards - Mice

ROADRUNNER SERIES

Baby Desk/Mini Tower w/PS	$47/44
Medium Tower w/PS	$68
Full Tower(230W)/Big Tower(300W)	$89/169
Rack Mount W/PS	$299

DIAMOND SERIES (For Black add $5)

Baby Desk/Mini Tower w/PS	$74
Medium Tower Slim/Thick w/PS	$89/108
Full Tower w/PS	$119
File Server w/ 400W PS, 3 Fans 12 F/HDD	$439

External HDD/CD-ROM Cases

1HH w/PS 3.5"/5.25"	$69/79
1FH/2HH w/PS	$89
2FH/3HH w/PS	$109
SCSI Cables Int/Ext	$7/9

For Un-Interruptible Power Supplies see UPS's in Networking Section

KEYBOARDS AND MICE

Regular/Spill-Resistant 101	$16/19
MaxiSwitch/KeyTronic	$29
Small 11.5" 88 Keys/BLACK 101	$32
Russian Keyboard	$24
Japanese Keyboard, 106 Keys	$70
SEJIN J-Mouse (mouse under 'J' Key)	$89

Also line of European/Arabic KBs

S-Mouse/TBall	$9/21
LogiTech Ser/Bus bulk	$19/45
LogiTech Mouseman Cordless	$77**
LogiTech Trackman Portable	$66**
Microsoft white box S/B	$39/69
BLACK SERIAL	$19

POWER SUPPLIES

PS2 200/300W	$40/95
PS2 200W **GREEN PC**	$49
Full Tower 230/300/400W	$56/64/154

MASS STORAGE PRODUCTS

FlOPPY DRIVES

YE Data 1.2/1.44MB	$45/39
Teac 1.2/1.44MB	$47/42
Teac Dual Floppy 1.2 + 1.44 MB	$116
Teac 2.88 MB	$89
Toshiba 2.88MB	$58
(w/contl & 2.88 floppy disk)	$94

FLOPTICALS

IOMEGA 21MB w/1 Disk, Cable	$419
YE-DATA 21MB w/5 Disks	$392

HARD DRIVES

2.5" NOTEBOOK DRIVES

QUN 127 /256MB 16msec	$225/339

IDE

(Hard drive prices change often-please call)

QTM 80 19 msec (when available)	$149
Dae Young 120 MB (when available)	$154
QTM 127MB 17 msec(when available)	$179
MXT130 18ms	$182
CON/QTM 170MB 17 msec	$189
CON 210 14msec	$202
WD 212 12msec	$209
ST 214/260MB	$199/229
CON/WD250MB 14msec	$219/230
QTM 270/MXT 245MB 15ms.	$225/224
WD 340/MXT 340MB 12/14 ms	$265/275
CON/QTM 340MB	$254
CON 425MB	$319
WD 425MB 13msec	$330
FUJ 520MB 12 msec 5yr	$455
QTM 540MB 11msec	$429
MXTR/WD 540 12msec	$435/459
CON 540MB 12msec	$439
MICROPOLIS 1/1.8GB 10ms	$879/1189

SCSI - 3.5"

QTM 42MB SCSI	$69
CON/QTM 170MB 17msec	$189
CON 212MB 12 msec	$280
MXT 245/QUN 240MB Fast	$249/239
MXT 340MB 15 msec	$349
CON 340MB 13msec	$322
FUJ 520/QUN 540MB 11 ms	$465/448
MXT 540MB/CON 540 8/12 ms	$575/489
FUJ 1.2GB 10msec 5 year	$829
MXT 1.2GB 8 msec Magix	$CALL
MICROPOLIS 1/1.8GB 10ms	$879/1179
HP1.2GB 10.5msec	$974
ST1.2GB ST31200N 9 msec.,1"high	$829
ST12400N ST2.1GB 9MS	$1575

SCSI - 5.25"

HP 1.6GB/2.4GB 11.5 msec	$1610/1792
ST41600N1.7GB 11 msec Elite I	$1715
Fuj 2.4GB 12 msec	$1310
ST42100N 2GB 13ms Wren	$1489
ST42400N 2.5GB 11msec EliteII	$1695
ST43400N 3.5GB 11msecEliteIII	$2212

SUPER HARD DRIVES

Seagate Barracuda 3.5" HH (8 msec ....avg. seek, 4.17 msec lat., 7200 RPM)

ST11950N/ST12550N 1.7/2.5 GB	$1875/1995

FLASH CARD HARD DRIVE

ST 75A 1.8" 5.2MB IDE<1.5MS	$484
ST 710/720A 1.8" 10.4/20.9MB	$888/1177
ST 740A 1.8" 41.9MB IDE<1.5ms	$2068

EXTERNAL HRD. DRV. SUBSYSTEM

FOR EXT. HARD DRIVE,.......... ADD $99

TAPE DRIVES

(<500MB TAPE-BACKUPs)

Colorado 120 / 250MB	$99/139
Colorado KE-10 External kit with card	$105
Colorado External port card	$37
FC-10 high perf card	$85
Colorado Trakker 250MB	$329
Archive 250MB w/QIC,150MB/min,1"H	$146
Archive Viper 250MB hh SCSI I/E	$335/425

(>500MB for PC / SERVER)

Viper 525MB hh SCSI Int/Ext 6MB/sec	$440/530
Archive Anaconda 1.3GB Int. SCSI 5.25"	$868
Conner Tapestor 1.36 DC6000 Int. SCSI 5.25	$825
Mountain 2/4GB Filesafe Int Dat 4mm	$1629/1959
Archive 4320 NT 2.0GB DAT 3.5"	$829
Archive 4324NT 4.0GB TURBO DAT 3.5"	$1075
Colorado 2.4 / 4.0 GB Qic 5.25	$929/1499
HP 2GB DAT 4mm Int/Ext	$970/1060
HP 4-8GB DAT 4mm Int/Ext	$1119/1199
WANGDAT 3100 2.0GB 4mm Int/Ext	$889/989
WANGDAT 3200 4-8GB 4mm Int/Ext	$1099/1199
EXABYTE 750MB HH MINI Int/Ext	$692/860
EXABYTE 8205 5GB HH Int/Ext	$1595/1695
EXABYTE 8505 10GB HH Int/Ext	$2339/2505

(above drives require special contr & soft drivers)

TAPE BACKUP DRIVERS

Novaback for DOS//OS/2	$65
Novanet Multiuser NLM	$279
ARC Serve Solo	$175
SYTOS for DOS/NOVELL, GEN	$120
Conner Backup Exec for Dos/Win v3.3	$79
Conner Backup Exec for Netware v3.1	$259

MAG/OPTICAL (Rewritable)

TEAC 128MB 3.5" Int/Ext	$625/729
PinnacleTahoe 130 portable 3.5"Opti w/inter.	$999
IBM 127MB 3.5" Int/Ext	$833/943
Panasonic LF-7010 1GB 5.25	$2799
HP 1.3GB 5.25" SCSI-2 EXT	$2799
MAXOPTIC 1GB Tahiti IIM 35msec	$2260

REMOVABLE DRIVES

Syquest 44MB Dr.	$249
......W/Ext Case, Cables, Cart, Cont	$379
Syquest 88/105MB Dr	$308/389
Bernoulli 44/99 Insider	$907/840
IDE: Upto 1GB removable kits	$39
SCSI: Upto 1GB Removable Kits	$138

DISKETTES & CARTRIDGES

Floppy 1.44 Bulk	$.69
Floppy 1.2 Bulk	$.49
Tape DC2000XL	$18
Tape DC2120 250MB..Formatted	$18.5
Tape DC 6250 5.25", 1/4" Cartridge	$27
Tape DC 6525 5.25", 1/4" Cartridge	$31
TK50 for DECs	$26
DT-2400 2.4GB .25" Cartridge	$54
DT-4000 4.0 GB .25" Cartridge	$57
DAT 4mm 90 mtr HP/OEM	$19/14
DAT 8mm 54/112 mtr	$18/24
Syquest 44/88/105MB Cart	$62/94/85
Bernoulli 44MB/90MB 3Pk	$315/415
Magneto-Optical 650MB Cartridge	$159
Mag-Opt 600MB/650MB 5.25"	$109/149
Mag-Opt 128MB 3.5"	$59
Mag-Opt 10024 B/S WORM 5.25"	$109

VIDEO ADAPTERS & MONITORS

ISA/EISA ADAPTERS

MGP	$12
VGA 256k	$28
Trident 512K/1MB	$38/60
Tseng 1MB	$72
Mustang 1MB Window Accel	$72
Diamond Stealth 24	$149
Diamond Stealth Pro 1/2MB	$249/$339
Fahrenheit Plus wo/w VA	$149/169
Hercules Dynamite Pro 1/2MB	165/209
Hercules Graphite Pro 1/2MB	$259/399
ATI Ultra Grpx 1MB w/Mouse	$219
ATI Ultra 8514 1 MB	$259
ATI Ultra Pro 2MB (no mouse port)	$324
Genoa 7900 w/1MB	$99**
Genoa 8560 w/ 1MB	$179**
Genoa 6200	$39**
ATI Ultra Pro EISA 2MB	$399
AMI Fast View w/2MB Weitek P9000	$490
AMI Fast View EISA VGA Graphics w/1MB	$call

VLB/PCI ADAPTERS

(wm = winmark ver2.5)

MustangVT Trident 1/2MB	$74/119
MustangVC Cirrus logic 5428 1/2MB	$84/129
Spider 32 1MB/2MB,20 WM	$94/139
Spider 32 Plus 1MB	$98
Spider Blk Widow 1/2MB 54 WM	$185/269
DIAMOND Stealth 24vlb 1MB	$149
DIAMOND Stealth pro 1/2MB vram,36wm	$259/349
DIAMOND Viper 2MB,9000,50wm	$374
ORCHID Fahrenheit S3-805,1/2MB	$149/194
ORCHID Celsius 1/2MB	$200/260
Hercules Dynamite Pro 1/2MB	165/209
Hercules Graphite Pro 1/2MB	$259/399
ATI Ultra Pro 2MB, 26wm	$325
ET4000 Cobra 2MB PCI	**$185**
ATI VRAM 2MB PCI	**$379**
DIAMOND VIPER 2MB PCI	**$415**

CAD SPECIALITY ADAPTERS

NUMBER NINE - #9GXI/GXE

L10 ISA/VLB	$249
L11/I12 S3928, ISA&VLB	$359/429
L14 ISA	$649
L20/21 lite	$515/679
L23 WIND/ACAD,T34020,1280,16C	$955
L25F,40MHZ,WIN/ ACAD,,1280,256C	$1225
L29 T34020,1024X768X16.7M Color	$1359

MATROX

MGA-ULT 1A/2A&V	$369/485
MGA-IMP 3A&V/V+z buffer	$688/855
MGA-IMP 3 A/V	$715
MGA-PRO 4.5V/4.5+z buffer	$1119/1399
MGA-PCI 4/4-200	**$744/968**

METHEUS CORPORATION

Premier 928 VL2(1MB)/4(2MB)	$324/559
Premier 928 ISA 1M/2M/4M	$297/422/725
MODULE 1MB Memory	$119
1104 Plus 256 Hz, MultiDisplay	$1295
UGA 1228Hz 256, 60/74Hz	$1895/2095

(We do not have the high end CAD adapters and monitors on display and carry only a few in stock - these are on Just-In-Time inventory basis - please place orders in advance-the prices in parenthesis are on a cash basis only)

9" - 14" MONITORS

MONO

Mono 14" amber/white	$84
Mono 9" VGA or 14" SVGA	$109

VGA/SVGA

VGAIBM 8513 13" .28 refurb 6 mon	$155
VGA 14" .31 Refurb 6 mon	$155
SVGA 14" 1024 x 768 .39	$189
SVGA 14" 1024 x 768 .28 Int	$219
SVGA 14" 1024 x 768 .28 NI	$236
Black SVGA 1024 x .28 I/NI	$279/320
CTX 14" 1024 x 768 .28 Int.	$256
CTX 14" 1024 x 768 .28 NI	$269

CAD MONITORS

Miscellaneous

Darius 15" .28 1280xNI	$359
KANAKA 15" Hitachi Tube 1280 x 1024 .28	$349
Sony 1604s OEM	($835)$870
KFC 15/17"1280NI .28/.26	$379/$739
Mitsubishi 15FS DiamondScan	$495
Mitsubishi 17FS DiamondScan	($999)$1039
Mitsubishi 17 DiamondPro	($1065)$1099
MAGNVX20CM64 20", 1280, .31.	($1210) $1250

NANAO

F550i 17", .28,1024NI MPR2	($969)$999
F550iw17",.281280NI MPR2	($1156) $1189
T560i 17",.25 1280NI, MPR2	($1659) $1726
T560iw,.26 1280NI,MPR2 Promo	($1363)$1404
T660i 20",.30 1280NI MPR2	($2379) $2459
F760iw21".31,1280NI,MPR2	($2159) $2249

NSA-Hitachi

CM1797 17".28.1280NI,MPRII	($1177)$1225
CM2095 20" 1280 Anti Glare	($1299) $1345
CM2087 20" 1280 72Hz Mic	($1626) $1675
CM2187-515 21" .28 1280NI	($2049) $2130
CM 2188 21" .28 1280NI	($2415)$2499

Hitachi America - ACCUVUE

PS-20,.31dpi 1600x NI	($1585)$1645
PS-21,.28dpi 1600xNI	($2079) $2155
PS-21A,.28dpi 1600xNI	($2295)$2389
PS-21.28dpi 1600xNI Mic	($2359) $2440

Sony

CPD1430s 14" 1024NI .25	($529)$545
CPD1730 OEM 1024NI .25	($879)$899
CPD 1730 Original 1024NI,.25	($1019)$1049
GDM17SE 17" 1600NI .25	($1179)$1214
GDM2036S 20", .1280NI,.30	($1989) $2059
GDM2038 20",1280NI,.30	($2249) $2329

Nokia

15" 449E,.28 1024NI	($527)$543
17" 447B Trin.25dpi,1280x	($977)$1005
21"445M.26,1280NI	($2071)$2133
21"445X.26,1600NI	($2622)$2710

Sampo

Sampo KDM1767 17" .28	($675)$719
Sampo 1777 17" .28 Microp	($755)$795
Sampo 2055 20" .31	($1040)$1075
Sampo KDM2077 20" NI 1280 .31	($1460)$1520

NEC

CDR-400/500	$455/$506
3V/4FGE	$575/($715)$738
5FGE/FGP17", .28, ($1090)$1149/($1325)	$1365
6FGP21", .28, 1280NI	($2487)$2555

MAG

LX1564 15" .28, 1280NI	($395) $405
MX15F 15"MPRII	($505) $515
MX17F,17".26,1280NI,Mic Org	($895) $905
MX17FG,17".26,1280NI,	($905)$915

AT ASA... ...WE DELIVER

NATIONAL: 1-800-REAL-PCs

SILICON VALLEY: 1-408-PCs-FOR-U

MULTI MEDIA

CD-ROMs

IDE TYPE CD-ROMs

CD-ROM-#1-of-the-Month

Mitsumi Kit 350msec, 150 KB/S	**$119**
Panasonic 562 DblSpd.320ms, 300kb/sec	$199
Sony 31A-03,DblSpd 330ms,300KB/sec	$205
Mitsumi Dbl-Spd 250ms,300kb/sec	$199

Super Multi-Media Complete Kit on Sale!
Mitsumi CD-ROM, 150KB/sec, 350ms
8 bit Sound Blaster Compatible Card (for Win)
Quickshot Warrior joystick
Shielded PC spealers
Deluxe model microphone
Award winning Apogee sound-supported
games; all for................**$179!!!**

SCSI CD-ROMs

NEC 3XE Ext 195ms,450KB/sec	$599
NEC 3XP Portable 250ms,450KB/sec	$445

CD-ROM-#2-of-the-Month
NEC 3X CDR-510 Multispin, 195ms,450KB/sec
......**$419**

TOSHIBA 3401B/E 200ms, 300kb/s I/E.	$337/459
Texel 3028/5028 240ms, 335kb/s I/E	$269/419
SONY CDV561, 295ms, 300kb/sec	$336
Microsolution,350ms,Parallel port	$339
Future Domain SCSI CD-ROM Kit	$69

AUDIO CARDS & MPC KITS

Hyena Snd Blster Comp. 8bit Sound Card	$39
Hyena w/ Speaker, Joystck, mcrphn, games	$59

MEDIA VISION

Pro Audio 16 Basic	$119
Pro Audio Spectrum 16 ORG/OEM	$129/115
Pro Audio Studio 16/Power Pack	$199/69
Fusion Double CD16 Kit Int/Ext	$475/495
Pro 16 Multi-Media System/II	$609/764
Pro Movie Spectrum/Studio II	$279/309

CREATIVE LABS

Sound Blaster Deluxe 8bit	$67
Discovery 8/16 Upgd. Kit	$369/429
Edutainment 8/16 Upgd. Kit	439/489
SoundBlaster 16 Basic/SCSI 2	$129/179
SoundBlaster 16 ASP SCSI/MCD	$209/189
Sound Blaster Voice Editor	$55
Wave/Video Blaster	$179/305

MISC MULTI-MEDIA PRODUCTS

Logitech Fotoman Digital Camera for PC	$465
Logitech SoundMan 16	$109
Intel Smart Video Recorder	$520
Cardinal Tech Digti Sound Pro 16/Plu	$145/186
Video Logic Captivator Kit win3.1	$369
Midi Mate/CDPC XL	$49/1059

PLOTTERS, DIGITIZERS, SCANNERS & PRINTERS

PLOTTERS

HOUSTON INSTRUMENTS

HI 1117 A/B size,8 pen	$645
V50 INKJET A-C,2MB BUFFER	$1479
HiPlot 7100 A-D 8 pen,LCD display	$2639
HiPlot 7200 A-E 8 pen,LCD display	$3469
DMP-162R A-E, 8 Pen, Roll Feed	$4455

DIGITIZERS

SUMMAGRAPHICS

III 12x12 w/16btn or 4bt & Pen	$299
III 12x18 w/16btn or 4bt & Pen	$539

KURTA

XLP 12x12 w/4btn & Pen	$225
XLP 12x18 w/16btn or 4btn & Pen	$429
IS/ONE 12x12 single cursor	$275
IS/ONE 12x12 two cursor or 12 btn	$299
IS/ONE 12x17 single cursor	$469
IS/ONE 12x17 two cursor or 12btn	$495
XLC 36x48 w/16btn or 4btn&pen	$1540

CALCOMP

CALCOMP 12 X 12/12 x 18	$279/629
CALCOMP 18 X 24	$1275
CALCOMP 6 X 9/12 x 12 P Series	$439/485

SCANNERS

LOGITECH (HAND-HELD)

SCANMAN-COLOR/w OmniPage	$439/479
SCANMAN 256GS / w OmniPage	$159/199
SCANMAN 32GS / w OmniPage	$135/125
SCANMAN EASY TOUCH	$219

MICROTEK

SCANMAKER II/IIXE 600dpi w/OCR	$659/1038
Scan-in-Dex Business card scanner	$275
SCANMAKER 35T Slide,1800dpi,w/Photo.	$1399

MUSTEK(Hand-held)

ScanMagic256,400dpiw/perceive	$109
ScanMagic Color,400dpi,256 grays w/perc	$215
GrayArtist,800dpi,256 grays w/perc	$159
Colorartist Pro,800dpi,256&colr w/per	$315

MUSTEK (Flatbed)

MFS-6OOOCFB 600dpi,16mill clr,w/Perc	$685
Paragon 600(dpi)24 bitclr,Photoshop	$665
Paragon1200(dpi)24 bitclr,Photoshop	$1125

UMAX Technologies

UC 630 PC,1200dpi max,24bit /256gray	$859
UC840,1600dpi max,16.8 million clrs	$1225
UC1260,2400dpi max,16.8 million clrs	$1769
UC1200SE,2400dpi max.,30 bitclrs	$3039

TAMARACK

6000C-PC w/Colorshop,Photoshop 300dpi	$739
8000C-PC w/Colorshop,photostyler 400dpi	$853
1200C-PCX w/Crshop,Pictr PubLE600dpi	$999

(all Tamarack sanners include scsi card & cable)

Miscellaneous

LeoScan 610 sheet feed,300dpi/256 gray	$599
Westbrook File Majic OCR for scanners	$285

PRINTERS

Miscellaneous

Star Micrnix NX1001 9 Pin.120/220V	$134/144
Star Micronix 220v quantity of 100 only	$135
IGOR 132 9Pin Wide 220V (Cyri..).in stock......with any purchase	$110

EPSON

LX810 9Pin dot matrix,3 res. fonts,4k	$183
Action 2250 9 pin,50sheet,240cps	$129
LQ 1070+ 24 pin Wide,252cps,11fts	$409
LQ 1170 9pin Wide,2 resident fonts	$676
Stylus 300 Inkjet 360dpi,150cps	$252
Stylus 800 Inkjet 360dpi,150cps,100sht	$298
Action Laser 1000 300dpi,6ppm,512k	$699
ActionLaser 1500 300dpi,6ppm,1mb...(678)	$729

CANON

BJ 200,360dpi,49k,7fnts,248cps,4ppm	$309
10SX,110cps,360dpi,Portable	$269
BJC 600 Color,240cps,360dpi,100shtfd	$649
BJC 820 Color,240cps,4ppm,1MB	$1635

OKIDATA

OL400e, 4ppm, 300dpi	$(528)539
OL810, 8ppm, 300dpi	$955
OL830 Plus, 8ppm w/ 2MB post script	$1189
OKI ML184T dot matrix, rugged industrial	$229
OKI ML320 320cps 9pin	$315
OKI ML590 24 pin..auto form sensing	$460

PANASONIC

KX-P2124, N-Carr, 320cps, 360dpi, 12fnts	$335
KX-P1624, W-Carr, 192cps, 360dpi, 14fnts	$415
KX-P4410,5ppm,300dpi,28fnts,512k	$599

CITIZEN

GSX230 24 pin.8 fonts, 270cps	$249
(color option for Citizen 80 col printers	*$45)*
GSX240 24 pin 300cps, 13 fonts	$315
Notebook Pr. CTZPN48 w/bat	$284

HEWLETT PACKARD

Deskjet 500 inkjet300dpi,120cps,16k	$308
Deskjet 500C Color 300dpi,167cps 16k	$409
Deskjet 550C Color,3ppm,300dpi,80k	$605
Deskjet 1200C Color,300dpi2MB	$(1375)1433

NEC

Pinwriter3300 24pin wide,360dpi,80K	$353
Pinwriter6200 24pin narrow,360dpi,80k	$442
Pinwriter9300 24pin wide.360dpi 333draft	$940
Silentwriter superscript610,6ppm,256k	$626
Silentwriter95fx built-in fax,300dpi,2MB	$1221
Silentwriter1097 600dpi,7mb.....($1505)	1533

FUJITSU

10 Laser,10ppm,1mb 14fonts	$840
10W Laser,10ppm,2mb,35fonts	$952

We take orders for bulk quantities of printer supplies at wholesale prices.

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MEMORIES for IBMs

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256 x 9 (3 chip)-70NS	$12
1M x 9 (3 chip)-70 Major brand	$39
1M x 9 (3 chip)-70NS IBM original	$38
1M x 9 (9 chip)-70NSMajor brand	$42
4M x 9 (3 chip)-70	$150
4 x 9 (9 chip)-70NS	$154
1M x 9 (3 chip)-60 Major brand	$41
4 x 9 (9 chip)-60NS	$160

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256x36-70NS	$55
512x36-70NS	$95
1x36-70NS	$155
2x36-70NS	$325
4x36-70NS	$640
1x36-60NS	$158
2x36-60NS	$335
4x36-60NS	$660

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256x9 (3 chip)-70NS	$13
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1x9 (3 chip)-60NS	$46

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256x4-70/60NS	$5.75/5.50

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Centras & Quadra 600 series

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486 DX 50	$410
486 DX2 50	$285
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Pentium 60MHz	$889
Pentium 66MHz	$1250

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486 DX2 50	$240
486 DX2 66	$375

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3C87SX-16/20/25	$39
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83D87-33	$41
83D87-40	$41

WEITEK

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4167-33	$425

LASER EXT. MEMORIES

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OKI 800/820	2/4MB	$123/193
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Epson 6000	2/4MB	$134/205
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Special Terms and Conditions for this Section: CPU and Memory prices are changed on a daily basis; please call for the latest prices. These products when bought without systems may come with a shorter warranty - please enquire. We do not stock many of the above products - please call for availability.

SOFTWARES

For Networking, Communications, Tape Storage Drivers, Networking Drivers, Multi-Media and Speciality Softwares also look in the corresponding sections.

UTILITIES

Norton Utilities V 7.0/Anti-Virus v2.1	$116/89
QEMM 386 V7.0	$69
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Micrographx Graphics Works	$158

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Paradox V4.0/WIN	$524/145
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Gupta SQL gateway for netware	$3252

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Norton PC Anywhere 4.5 Host/Rem	$65/86
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PONY 992NZ 96/24 F/M, v. 42 bis Enh	$63
PONY 1414IZ 14.4 F/M,.32/.42 w/Bitfax Int.	$115
PONY 1414IG 14.4 F/M .32/.42 w/WinfaxExt.	$129
PONY 992PZ Pocket 96/24 F/M,.32/.42	$79
PONY 1414PZ Pocket 144 F/M, v.32, v.42	$189
PONY 992MG PCMCIA 96/24 F/M v. 42	$125
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Modem Sharing Single/Dual Kit	$495/889
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.......$249

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NE2000 Plus Comp Combo soft/hard config	$54
D-Link 16 Bit,SoftConfig. 10BT 1/6 Pack	$69/389
Intel EtherExpress 16/5pk/20pk	$104/479/1825
Intel EtherExpress 16 MCA/16 MCATP	$171
Intel EtherExpress 32 EISA Coax	$419
Intel EtherExpFlash/C/5pk/20pk	$127/509/1885
SMC Ethcard 16 UltCx/6 Pk/24pk	$109/574/2149
SMCEthcard+IA for MCA/TP	$179
SMCEthcard+Elite16 Cx/TP1/6/24	$119/615/2289
3 Com 503 Etherlink II 16 Bit Coax/TP	$159/169
3 Com 507 Ethlink II 16 Bit Coax/TP	$279/299
3 Com 509 Ethlink III Coax/5Pk	$119/505
3 Com 509 Ethlink III Combo/5/20	$145/559/2199
3 Com 529/579 EISA Coax/10 BT/5pk	$229/959
EagleNE2000 Plus /5Pk	$109/459
EagleEP2000 Plus/5pk	$92/405
Asante Etherpack2000+ Coax/10 BT	$129
Microdyne NE2000 Plus	$109/94
HP Ethertwist PCLink/6pk	$159/759

ARCNET

16bIT Star/bus Topology-combo	$65
4Port Passive Hub	$15
8 Port Coax stackable Active Hub	$139

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Intel Token Express 16/4 ISA/MCA	$429/469
SMC Token Ring Adapter 16/4	$345
3 Com Tokenlink III 16/4 ISA/EISA	$455/635
IBM Token Ring Adap II	$289

POCKET LAN ADAPTERS for Notebooks

Advanced LAN Net Coax/10BT	$129
XIRCOM PE3 10B2/BT/BC	$274/274/299
XIRCOM 16/4 MBNS Tokenring w/Type 1Bnc	$525
Xircom 16/4 Tokenring w/Type 3Coax	$525
DLINK DE-600 Softconfig. Coax/10BT	$172

PCMCIA ADADAPTERS for PalmTops

DLink DE-650 Coax/TP	$191/195
NATIONAL NE4100 COAX/10 BASE T	$214
XIRCOM Credit Card BNC/RJ-45	$269
XIRCOM Crdit Card Courso	$299
GVC Adapter	$137

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Ce-Lan 4-Port BNC/AVI Repeater	$445
Allied Telesis 4-Port Repeater 2AVI,2BNC	$750
Allied Telesis,4-Port,8BNC,1AVI	$699
Allied Telesis,8 -Port,8 BNC,1AVI	$785
Allied Telesis-3008 Multi-port 8BNC,1AVI	$1189

Hubs

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CeLan 8 Port 10 BT w/BNC Cascade port	$199
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Intel EE 12 Port 10 BT Hub Int w/Harmonica	$634
Intel EE 12 Port Hub Int EISA w/Harmonica	$699
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Synoptics 2803 16 Port w/AVI	$749
Synoptics 2804 16 Port w/Fiber Optics	$951
3 Com Link Builder 3C621 12 Port	$729
3 Com Link Builder TR 3C510180/82	$1751/3599

BRIDGES

Allied Telesis local Ethernet Bridge	$1645
3 Com 802C NetBuilder local Ethernet	$3399
3Com 750 NetBuilder Token Ring local	$4714
3Com 5823C NetBuilder Remote	$5319
Synoptics 3323S Ether Local w/AVI	$2353
Synoptics 3522 Token Ring	$5319
Novell Multiprotocol Router v 2.0	$669

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Ethernet Print Servers

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Ethernet NetPort II for Coax,10BaseT	$385/379
Token Ring NetPort with DB9 Connector	$529
Netport ExpressXL Coax, UTP, 10BaseT	$624

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OTHERS

Eagle NPE400 Parallel Port RJ-45/Coax (1P)	$364
XIRCOM Pocket Ethernet RJ45/Coax	$305/289

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PrinterLink Par Line Extender DB-25(w/50')	$69
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ModularLink Starter Kit	$106
PrinterNET Transm DB-25(w/25')	$69
PrinterNET Transm Centronics (w/25')	$69

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Ver 3.12 5/10/25/50 User	$649/1429/1895/2575
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Ver4.01 25/50 User	$2675/3699
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Netware Lite v1.1 w/Win utilities	$69
Netware Lite v1.1 w/Win Util&Dr. DOS	$89
Dr. DOS 6.0	$75

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AE-2/3 16 BitAdapter w/lantastic soft	$192/234
Lantastic 2MBPS Kit 5.0	$339
Lantastic v5.0 AI DOS 1/6/12pk	$81/479/959
Lantastic v5.0 AI Win 1/6/12pk	$93/549/1099
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6GB,4ea,2GB ST Barracudas	$12995
8GB,5ea. 2GB ST Barracudas	$15495
1GB,Hot Spare	$1050
2GB,Barracuda Hot Spare	$2395
Add second channel module to split the drive packs	$895

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4GB,5ea.1GB drives,10msec	$6995
6GB,4ea.2GB drives,10msec	$9995
8GB,5ea.2GB drives,10msec	$11995
1GB Hot Spare	$1050
2GB Hot Spare	$1995

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APC-BK400, 10 min, 286, 386SX, ws	$159
APC-BK600, 15 min, 386 486 FS	$265
APC-BK900/1250, 15 min, Multi FSs	$369/509
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APC 600, 15 min, 386, 486 FS/WS	$345
APC 900, 15 min CAD/CAM WS/FS	$545
APC 1250, 15 min, Multiple FSs	$675
APC 2000, 20 min, Mini Computers	$1115
Matrix UPS 3000 VA, Multi-server	$2679
SERENA 5.25" 300VA UPS mounts in PC.	$call

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UPS Monitoring Board for Novell	$69

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Translated by Taku Fujita

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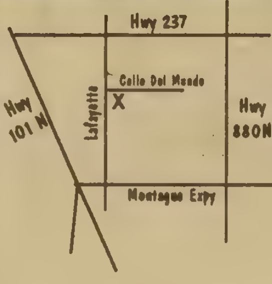

Santa Clara, CA

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COD, FOB Santa Clara, CA. Credit terms are available on approval. Manufacturer's warranty on parts varies. Three years limited warranty on systems assembly labor only. Prices are subject to change. Prices in () or marked with a "*" are on cash basis only. Prices marked with "***" are clearance items & available while quantities last; regular prices for these items may be different.

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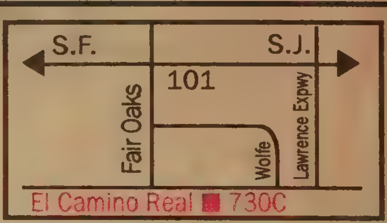

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$1250

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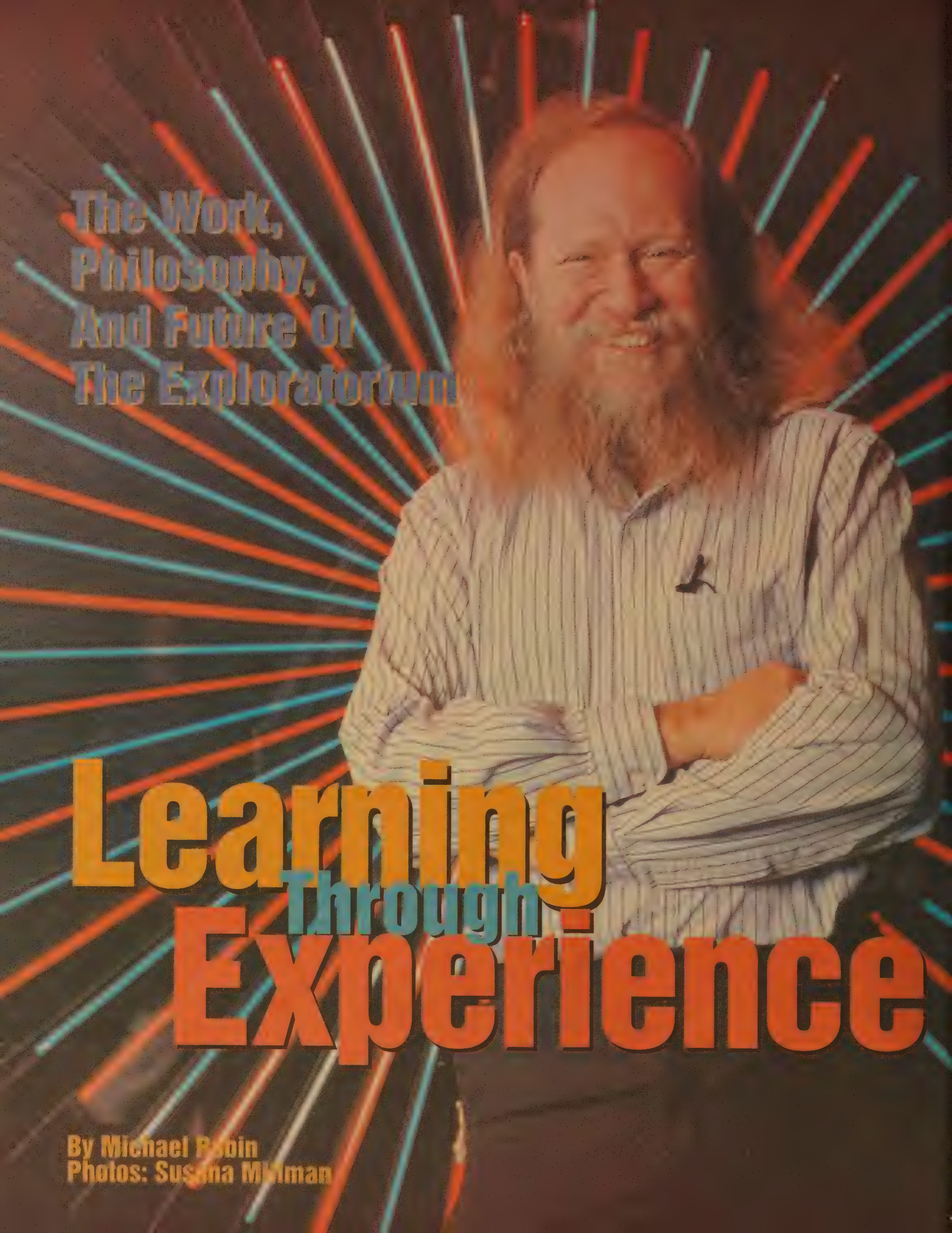
The Work, Philosophy, And Future Of The Exploratorium

Learning Through Experience

By Michael Robin
Photos: Susana Millman



> **“If people feel they understand the world around them, or, probably, even if they have the conviction that they could understand it if they wanted to, then and only then, are they also able to feel that they can make a difference through their decisions and activities.”**
>
> **—Dr. Frank Oppenheimer**

Dr. Frank Oppenheimer, known to everyone as Frank, had a vision that continues to live within the organized mayhem of San Francisco’s Exploratorium Museum. As a physicist, teacher, and founder of the Exploratorium he worked to demystify science and empower individuals with a greater understanding of the world around them—an understanding of natural phenomona. Towards this goal he worked to fill the Exploratorium with exhibits “designed to make things clear rather than to cultivate obscurantism or science fiction.”

He believed that learning was addictive, but only when people could experience discovery themselves. Thus the Exploratorium created a unique setting with a minimum of structure and intimidation, for people to explore science, art, and human perception, where learners become involved with their hands as well as their minds. Exhibits and explanations are designed to help visitors achieve the satisfaction of self-discovery. Frank wrote, “We do not want people to leave the museum with the implied feeling: ‘Isn’t somebody else clever.’ Our exhibits are honest and simple so that no one feels he or she must be on guard against being fooled or misled.”

For the past twenty-five years, kids and adults, teachers and students, tourists and residents have been visiting the Exploratorium, located near the Golden Gate Bridge, in the only remaining buildings from the 1915 Panama-Pacific Exposition. It is a place where teachers come to learn and students can become teachers.

Slightly more that 625,000 people walk through the Exploratorium’s doors each year. The museum contains a collection of 650 interactive permanent exhibits, space for temporary shows, clasrooms for training teachers, a 175-seat theater, library, and museum store. However, the Exploratorium’s impact extends to millions of people each year through the dissemination of exhibits and programs to other museums and through its work with teachers.

The list of organizations in the US that have worked with or been influenced by the Exploratorium includes museums in thirty-two states and such places as the Imaginarium in Anchorage, Alaska, the US Space Foundation in Colorado Springs, Colorado, and the New York Hall of Science on Long Island, New York. Around the world, its impact is felt in thirty-three countries from Argentina to Japan, from the Republic of China to Wales. Closer at home, the Exploratorium has very active programs working with high school and K–8 teachers.

The current executive director, Dr. Goéry Delacôte, is working to both continue Frank’s vision and extend it. “It is by doing something that visitors find answers to questions that they themselves have been led to ask,” Delacôte recently stated. “A problem is already half solved when it is put in the form of a question. This place should generate questions.”

He continued, “Since the Exploratorium’s inception, the museum’s exhibits and programs have focused on human perception: How do we see, hear, smell, feel, and otherwise experience the world around us? It is natural to expand that focus, going beyond perception to include cognition—in other words, using the mind to understand the very workings of the mind itself.”

Larry Shaw is the technical curator of the Exploratorium. As a staff member for twenty-one years, he enjoyed working closely with Frank Oppenheimer (who was the director from 1969 until his death in 1985), making Frank’s vision real. Shaw continues to design and build exhibits, and work with teachers and artists. His latest projects involve computers, multimedia, and telecommunications, helping to take the Exploratorium into the next century. We recently met to explore the museum, its mission, what it does, and how interactive technologies fit into its future.

You are the Exploratorium’s technical curator, what is that?

I have had that title for many years. When I started here, Frank [Oppenheimer] said, “You can put down anything you want except ‘director.’ ”

I have many hats. Basically, I am looking for technology that furthers the mission of the museum. My back-

Learning Through Experience

ground is physics, I've done AV and electronics for years. I have a few other hats as well. I've done some electronic music, some computer art. And I have had the pleasure of being support for the artist-in-residence program and the speaking-in-music program. I have received a very good arts education, informal arts education, by interacting with artists of various types over the years.

The position per se is one of trying to make sure that we can make use of technology for what we are doing. It also means making sure things get done, such as actually stringing the cable for an exhibit.

We don't have a very strong division of classes or hierarchies. For instance, elsewhere in building exhibits, the builder isn't always the designer of the exhibit per se. Here, we talk about the ideas of what we want, then somebody will say, "OK, I'll run with that." They go off, build a prototype. They show it to people and it gets modified. There is a continuous process of feedback. After building an exhibit, you get to repair it until the "design problems" are solved. The exhibit can be an albatross around your neck until any repairs are simply a part of the general maintenance. Even with our artist-in-residence program, the artists don't get the last 10% of their fee until their exhibit has been on the floor a month, with its [design] problems solved.

You have been here pretty much since its beginning?

Well, actually no. The beginning was in '69. In 1972 we got an NSF [National Science Foundation] grant, our first large NSF grant, and a lot of people were hired and I was one of them.

Interactivity and multimedia are popular terms these days as educational tools for helping people learn. The Exploratorium has been building interactive exhibits for twenty-five years. What has been your experience with presenting information interactively?

Presenting interactive information is what we are going towards.

What we have been doing is three-dimensional interactivity with the exhibits, and for kids it often includes big muscle activity; real things with real objects and with feedback. There is a kinesthetic sense for most of the things here. That has been the primary focus, working with that method for understanding.

To export this into some other media form is really difficult, partly because of the degree of interactivity that is needed—interactivity in the sense that when you do something it responds instantaneously. You should be thinking about *what* you are doing, not *how* you are doing it. The interactivity has to be very responsive, as if you are directly manipulating an object. I haven't seen this done very well in media things yet.

A couple of years ago, there was a paper in the journal of the ACM that showed that if the computer does not respond in about three-tenths of a second, it is in your way. So, even though you may have to do lots and lots of little things that you wouldn't really want to do, as long the computer's responding and you are doing the next thing in the chain, you will be engaged. It is this engagement that has to be encouraged. This is sort of the essence of what I've seen about responsiveness.

Looking into the future for a moment, given the fast rate of scientific and technological change, how is the Exploratorium changing in its use of computers and digital media?

The underlying thing for us is that we are involved in experiential learning; that you learn by experiencing things. It is easy to do the physical hands-on things. Experiential learning with multimedia objects, we are headed in that direction.

We have a proposal before the NSF for what we call the Learning Lab. It has several components. One is being able to take data from real exhibits on the floor and manipulate it in a more abstract manner. We will be connecting computers up to sensors on the exhibits, so that you can take real data and go home with a graph of what you actually observed or whatever the particular output is. This is one of the ways to increase learning. There are lots of exhibits that you can observe here, but you don't have a large amount of cognitive learning with them. The exhibits are strictly experiential.

The new framework that we are using includes cognition, understanding of what your experiences are. This includes media. We now have more mediated exhibits on the floor. We are working with a consortium of museums on a set of AIDS exhibits. One of these exhibits has a mechanical input device connected to a maze hooked up to a Mac. If you read all the labels and such, it allows you to see how the body's defenses work against the virus. It is interesting conceptually because as you try to manipulate the ball through the maze you are trying to get the person infected. You are doing this from the virus's viewpoint, not from the human's viewpoint.

Multimedia is both something people are learning about and a tool for teaching. Does this create any conflicts or problems when you are designing new exhibits?

Actually we are not teaching about multimedia, per se. We are a phenomena-based museum. We are interested in showcasing natural phenomena. It can be subtle things like perceptual cognitive phenomena, as well as physical, electrical, etc., standard physics phenomena. But we are phenomena based and multimedia is a way to extend the ranges of our understanding, having exhibits we couldn't normally have.

The Exploratorium has around 650 interactive exhibits showing and teaching about science and technology...

Well, it is not so much about technology. It is about science. It is science, art, and perception; based on perception and awareness. Technology keeps changing, the underlying principles are what we are interested in. We want people to say, "Oh yes, this is another example of this type of thing" or "Oh, it is obvious that they would have to do that"—having a technological answer show a particular phenomenon.

We are currently working on a set of exhibits on "feedback." While it is pretty abstract, everybody uses feedback almost all the time. When you are driving a car down the road, you are using mostly visual feedback. The Bots dots between lanes on the highways are tactile feedback that tell you that you are out of your lane. Everyone experiences feedback, we are looking at ways to make that more obvious—where feedback occurs and what the parameters of experience are.

We made a mechanical balancing stick which runs back and forth along a track. When it was first built, it was too good. It just sort of sat there. You touched it, the stick moved over a bit, and then would come right back. It was very boring. But by making the feedback system a little worse it would have trouble. What we hope to do on the final exhibit is allow you to play with how good the feedback is. That way people can see what makes a good feedback system.

Making it not work explains it better?

Right. But that's what people do. You do something until it breaks. Kids do that all the time. It is up to us to figure out how to make it bombproof *and* show what it does.

Years ago there was a demonstration I used for teaching to museum explainers. It showed that the shape of the wave going into a speaker, if you look at it on an oscilloscope, is the same way that a speaker moves. Basically, it was just an oscillator which you could adjust to run at some frequency, an oscilloscope showing the wave, and a speaker. You could watch the way a square wave jumps in and out or a sine wave has nice back and forth motion, or that a ramp has another motion. We tried to build an exhibit for the floor and make that bombproof. It ended up being the size of this [conference] table, with air bearings, an air pump, and a 200W amplifier. Everything encased. We went through this whole number and finally got it just about ready to go out on the floor. The director and I looked at each other and went, LOGITECH

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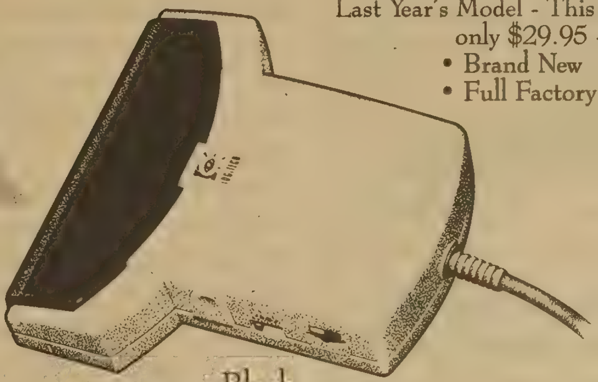

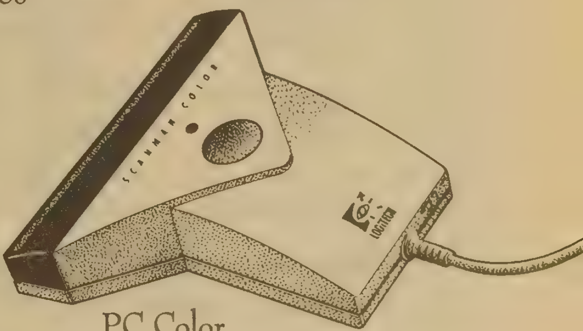

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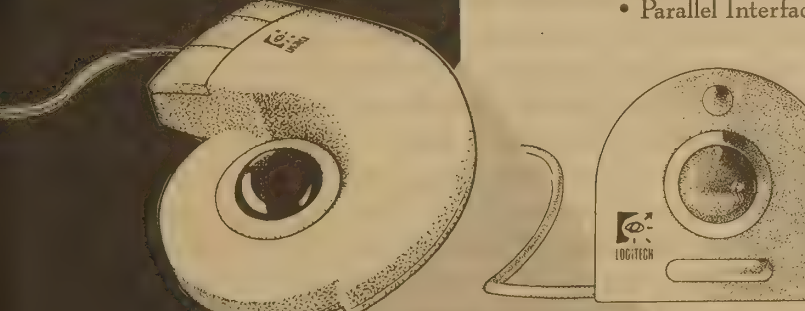

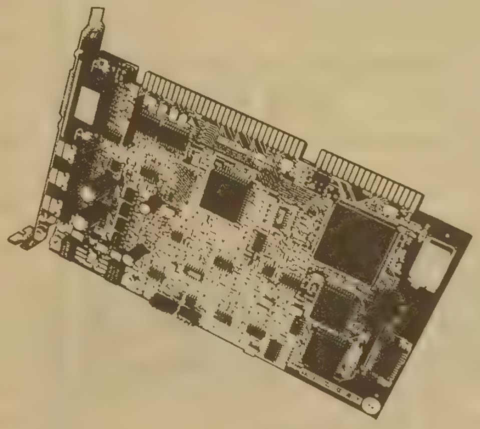

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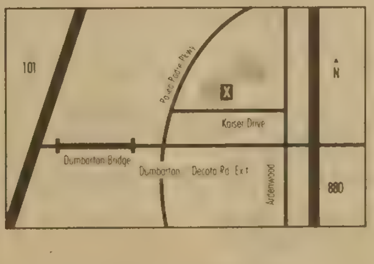

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Learning Through Experience

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The floor, or exhibition hall, is how most people know the Exploratorium, but it is only part of what goes on here. Can you tell me a little about the Centers connected to the Exploratorium and the work you do with teachers?

The Center for Public Exhibition, which is the floor basically, holds the exhibits. There is the Center for Media and Communication, that's where I am now. And there is the Center for Teaching and Learning.

In the Center for Public Exhibition we have about as many exhibits as we can handle. Basically, they are a teaching collection for people teaching each other about phenomena; but they are also for our Center for Teaching and Learning, for the teachers to learn about phenomena. Even though it may not look like it from the layout, they actually are coherent groups of exhibits. We will concentrate on an area, then we and the teacher go out and teach with them. With teaching you want to be able to show the next logical step. If there isn't a next exhibit, we go, "Oh, we need an exhibit on this." A lot of exhibits which are not particularly interesting in themselves are really a key in the steps along the way. They try to be coherent in that sense.

Our teaching program has between 120–180 teachers per year come through on long, six-week courses. They use the exhibits, but also do hands-on experiments and learn how to make their own mini-experiments. We publish a *Cookbook* of the exhibits for other museums to copy what we do. The teachers, through the various things they come to understand while they are here, have made a *Snackbook*, which we also publish, showing a lot of the same principles of the larger exhibits here but that they can do in the classroom that are cheap and generally last only long enough for the demonstration.

Where are these teachers from and what grade levels?

They are almost all local, the Bay Area, and mostly high school teachers. This program is called the Teacher Institute and gives continuing education credits. Generally, it is done in the summer when they have time. The National Science Foundation pays for their stipend.

We have another program called SITE, School in the Exploratorium, for K–8. Originally, it had classes meeting here. Now, mostly it is developing teachers in the K–8 level, mostly in Marin and San Francisco—San Francisco because of the proximity, teachers can participate after school, and Marin because there was money. The Marin Community Foundation has been a big supporter and SITE has touched most of the teachers in Marin.

A lot of the teachers in K–8 are not science teachers. A lot of what we have done in that program has been to enhance their confidence. That's a basic thing. The program includes an adjunct artist as a member of the team working with the teachers. This presents both an academic scientific understanding and a practical way of using the knowledge. The teachers are also learning the "discovery method"—they learn that they will continuously discover new things with their kids because each class is different.

Teachers learn about science, but learning about exploration is also key.

Exploration particularly. It is about process. You learn most when you are excited about what you are doing, when you are discovering it yourself, rather than being a passive container for the knowledge. It is all based on discovery, experiential learning.

That gets us back to issues of media and how you export experience. It's very difficult. But there is a large coalition of people working with multimedia in the Bay Area that is slowly beginning to solve this question. Everybody is inventing the concepts and the understandings of what it takes to make multimedia really work. Speed is one component, but there are also interface issues of how metaphors facilitate people's explorations.

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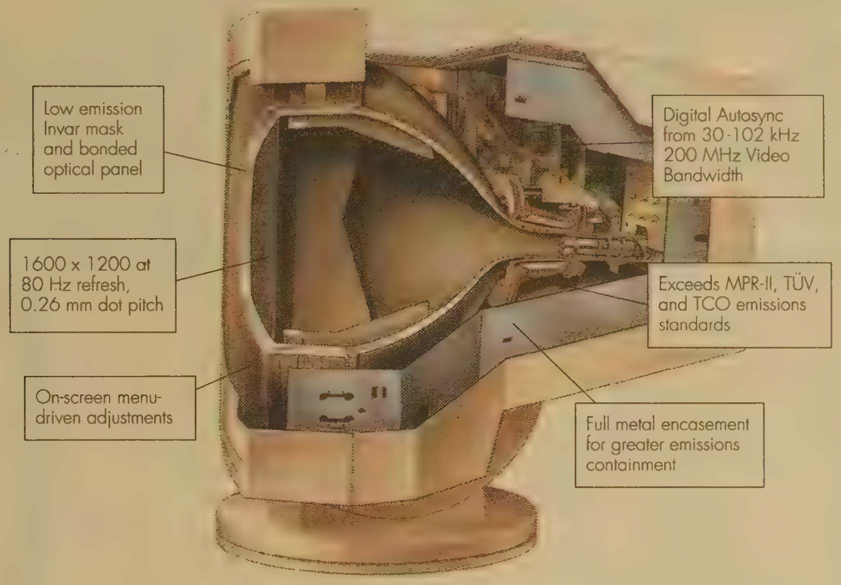
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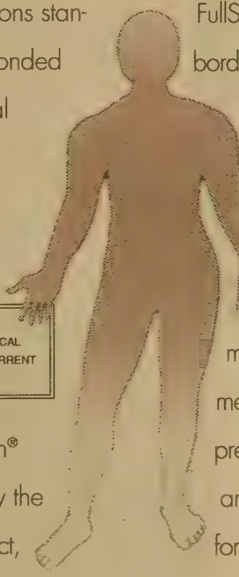

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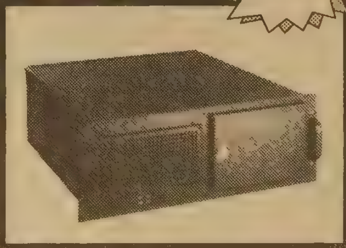

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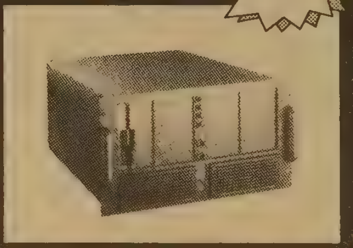

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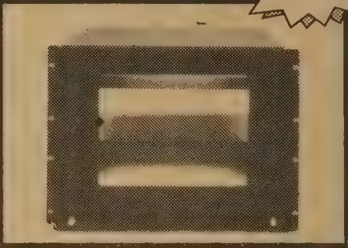

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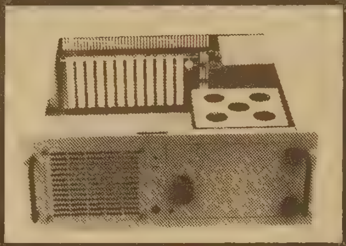

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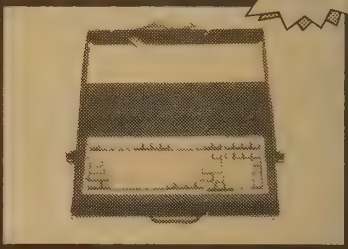

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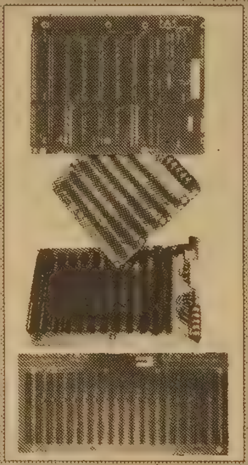

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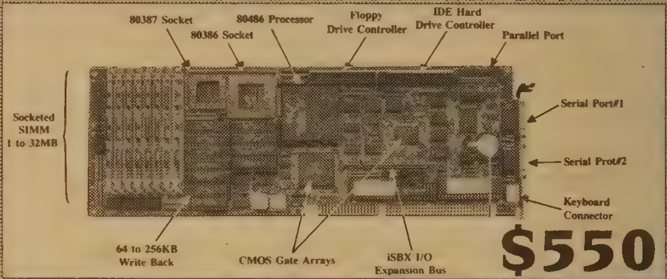

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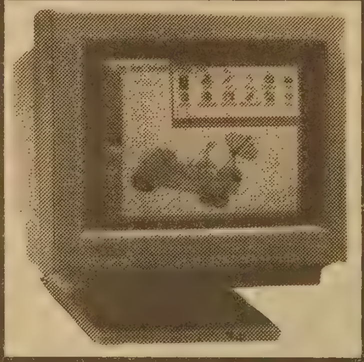

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Learning Through Experience

The various types of media clearly have their limitations. I really like Brøderbund's multimedia piece called Grandma and Me. Recognizing the limits caused by the data rate coming off the CD-ROM, they have still been able to do things that look totally natural. On the opening story page, there is a bus that comes across the screen. As it gets closer, and thus larger, they made it go off the screen. If they didn't, the image would have had too many pixels to keep the motion smooth. It's a really nice hack on their part. They pushed the medium to its limits and yet it did not interfere with the story.

Media is interesting. I sponsor an artists and technology organization called Ylem that meets here every other month. Late one night after people had presented a whole bunch of things, this one artist said, "Let me just show you this tape that I made called *The Burning Man.*" It was shot out in the desert near Pyramid Lake, on an old Fisher-Price camcorder that records on audio tape, and everyone was fascinated. It is black and white, sixteen levels of gray, 160 x 120 resolution. After three hours at a meeting people are usually leaving, but they stayed to watch this. The [quality of the] tape wasn't that good, but because it was so poor you spent a lot of your time involved in it trying to guess what was going on. You had a very heavy perceptual involvement in completion—what am I seeing, what am I looking at—plus it was sort of magical in its own sense. Those two things worked together. I was amazed to see that involvement by people in a very "technically poor" medium. It has to do partly with content, but also in using the problems of the medium to its best advantage for getting people involved in how to see this tape.

When people in one medium are trying to copy other media they aren't making use of their own strengths and weaknesses. It takes invention on the part of the creators to really make use of those media. This is being done, but only incrementally. People are stealing ideas from each other, which is just fine as far as we're concerned. It's different when you are in the competitive world. But I think that change has gone much faster because people are stealing from each other. The other guy says, "Well he did that with my stuff, I can now do this with it." And you are off to the next level of creation.

What sort of partnerships have been formed with technology companies in the area?

We are relatively new in this area. The first major thing that we were involved in was last year with Apple Computer and Kristina Hooper Woolsey as their Multimedia Lab was being dissolved. Apple had decided it had done its work when the Lab had begun making products. It had done the research of inventing tools and ways of looking at things.

One of the projects we did was with a fourth-grade class at Ross. It was there more out of convenience than anything else. The son of one of the Apple persons was in that school. Apple had been working with them and there were already computers there. Apple had this prototype multimedia software where kids would make little QuickTime movies asking questions. They would send them to us. To answer, we could annotate their movies with these tiny talking heads or with another QuickTime movie of some phenomena, or saying "here is something you can do," or "yes, that is a good question, but did you think about this?" So there were these conversations that went back and forth.

It was asynchronous; we couldn't get the telecommunications in place because it was too expensive for the budget and just time-wise. (Marin is sort of out in the boondocks in terms of telecommunications. As far as I know there are no plans for ISDN from PacBell for Marin; you can get switch-56, but you can't get ISDN.) With the asynchronicity it would be two or three days before the students got an answer to their question. But that didn't matter because they had recorded the question. They could see their question and then they would see the answer. They would recontextualize the answer very easily. It wasn't just coming out of the ozone.

At Ross, we ended up with between 350–400MB of material—that was their questions and our answers. It is very easy to generate many megabytes of stuff that's casual, that's not finished multimedia. It's interactive and of the moment.

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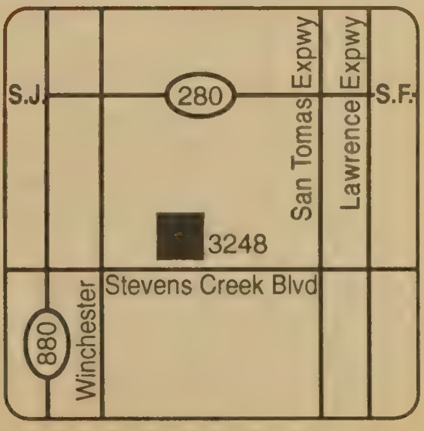

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Learning Through Experience

You should be thinking about *what* you are doing, not *how* you are doing it. The interactivity has to be very responsive, as if you are directly manipulating an object. I haven't seen this done very well in media things yet.

We did that last spring. This next spring we hope to expand it to two or maybe four schools, and do it via telecommunications. We are in the process of setting that up right now. It will probably be on weather because we're experts and already have materials available.

This also leads us to one of the network projects we are doing. The hypermedia of the World Wide Web seems to be a way of working with a lot of material. While the Web browsers like Mosaic are not the perfect hypertext or hypermedia systems, they exist. We are trying to look at exploiting that as one of our next steps.

Although not as well know as some of the other resources (such as ftp, gopher, or WAIS) that users work with on the Internet, World Wide Web is quickly becoming very popular among people at institutions that enjoy a strong, fast connection to the Internet. Could you explain the Web a little more?

CERN, the Center for European Nuclear Research in Switzerland, developed a hypermedia server. They developed it so that they could make hypertext connections between physics papers they were publishing. It was a way of indexing subject matter and section—essentially when you have a footnote you could go directly to the paper that is referred to in the footnote because it is hypertext.

That was their reason to invent this hypertext server. They give away the software. The National Center for Superconducting Applications at the University of Illinois at Champaign-Urbana has been working on making browsers, client browsers that can browse this type of server. Browsers called Mosaic exist for both the Mac and the PC, there is also one for X-Windows systems and UNIX Sun workstations. It is disbributed free via ftp on the Internet.

What is the Exploratorium doing, what sort of resources are you making available to people via the Internet?

Currently we have an ftp server, a gopher server, and now a Web server. Right now they are mostly about general organization—things like hours, memberships, etc. But because the Web is hypertext we can put QuickTime movies, sounds, and such. We could also have experiments, demos, and examples of the phenomena.

We publish a magazine which is generally on a single topic, such as dirt or nothing (which is on vacuum) or toys. They are done both for entertainment and teacher resources. We want to put back issues, the ones that are out of print, on our Web server, so that there are pictures there. We had a sound magazine that had a little record in it, that eventually will go on there. Since we have to generate income there is always an income problem around all this. But there is also a problem of copyrights. We don't have the electronic rights to these things. We didn't think about it when we contracted with the authors. The way the law works, that unless the author specifically gives up the right, they retain the electronic rights or any other rights, except for the serial publication rights that they have given us.

Where is Ted Nelson now that we need him? Remember Project Xanadu? Built into that system was to be the counterflow of money for the information. It looks like its time is almost here. The need is there and it would solve a lot of electronic rights problems for a lot of people, at least network problems.

Is there a vision of having part of the museum online?

Yes, definitely. Online and as interactive as possible. In the issue of the magazine on weather there were examples of various weather phenomena. One of the things you can do with hypertext on the Web is give the current weather picture. You click and it gives you what the weather is today. And it always shows today because it goes and gets the picture from the University of Michigan.

There is a publicly accessible part of the vision. But we are really bent on supporting teachers and science learning. There is an idea called Exploranet, which would be a connection to us and our resources. Building a community of teachers, continuing to support teachers that have come through the museum, helping teachers support each other, is all made easier through electronic communications.

During February one of the special programs at the Exploratorium is the Multimedia Playground: Roadside Attractions on the Information Highway for Kids and Adults. What will this include?

The easiest things to do are showcases for multimedia software. Letting people play with a range of things. We are a family-oriented museum and our greatest usage is on the weekends. People tend to teach each other. That works very well. In fact that is one of the criteria for exhibits, particularly media interactive exhibits. What is going on has to be obvious to people standing behind the operator. There are lots of interactions that can be quite satisfying to the person doing them, but are totally inobvious to onlookers.

We've got commitments to showcase quite a bit of software—generally standard CD-ROM-based software. We are also interested in the telecommunication and network aspects. We will have servers up showing the World Wide Web, gopher, and such. And having demonstrations and people talking about each one of those things.

Hopefully, we will have a virtual reality exhibit. We may do some long distance, interactive things. There is a widely distributed piece of software that allows people to interact over a modem in the same visual space on the screen.

Will there be terminals for people to sit down at and explore the Internet themselves?

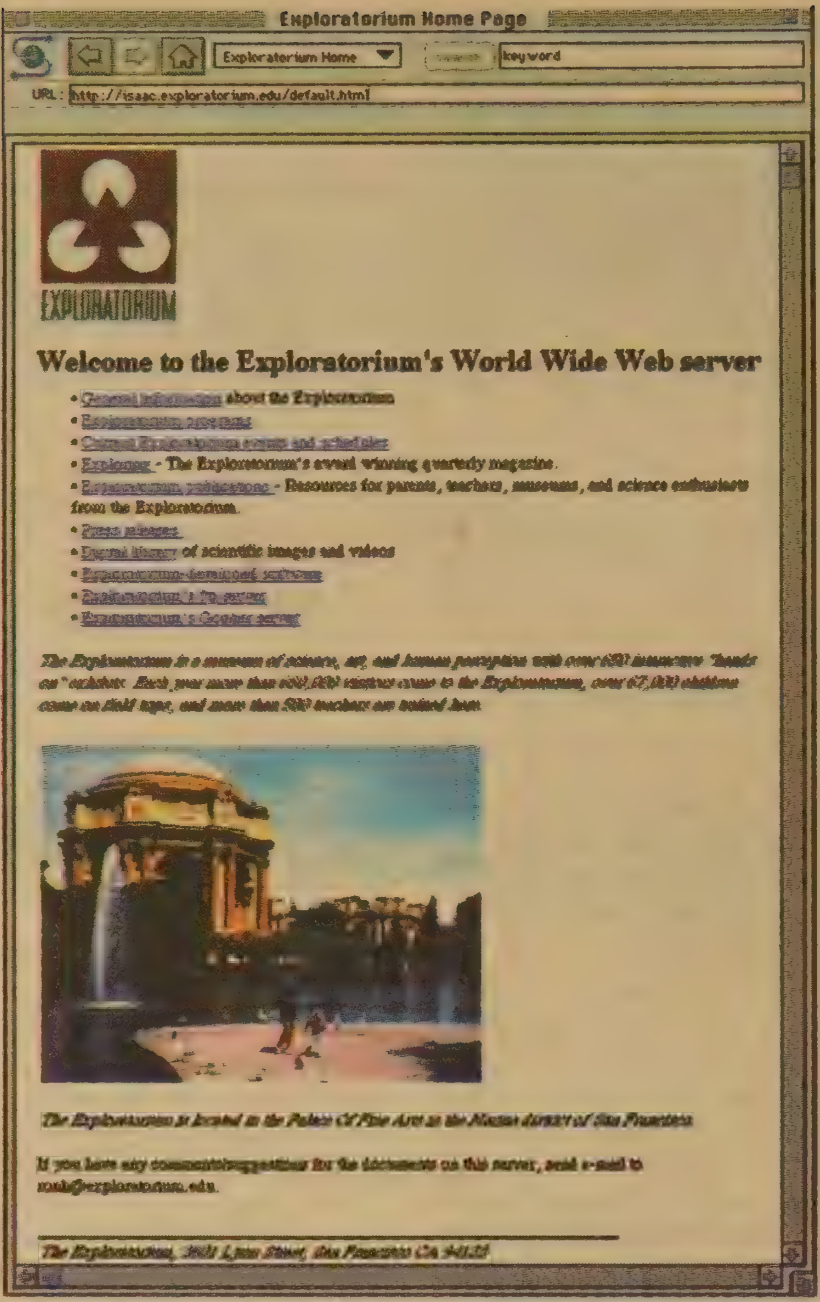
Yes. We will have fetch, the World Wide Web, and the Knowledge Network up, which is PacBell's gopher that allows people to work with a variety of academically oriented references and projects. We hope to introduce people to that through talks and by hands-on.

Hands-on is a real problem. The Web is the most accessible because it is visually available. The problem is that if a person spends fifteen minutes at the computer, you get four persons per hour. If we are open seven hours, that means twenty-eight people each day. This is one of the reasons you want to have as many terminals as you can.

Given what you said about experiential-based learning, how do things like the Multimedia Playground and the exhibits on Black History Month fit in?

Black History Month has been "celebrated" here for several years and is an attempt to broaden our own and the public's perspective and to become more attractive to a wider audience. We are aware that we are a white, middle class institution and are making attempts to broaden ourselves. We have a multicultural coordinator but I think we really aren't very creative in this area. (Science tends to be something of white cultural interest; a historical and economic bias but, I think, changeable.)

As far as the fair goes, it's partly an extension of our own work in multimedia and networking plus it's hot so our "marketing" department saw an opportunity for more attendance. We have a history of showing interesting technology from time to time. We did a very successful show on medical technology where we had equipment plus medical professionals to demonstrate and, most importantly, answer questions.



Welcome to the Exploratorium's World Wide Web server

- - The Exploratorium's award winning quarterly magazine.
- - Resources for parents, teachers, museums, and science enthusiasts from the Exploratorium.
- of scientific images and videos

The Information Highway, and Wide World Web, will let more people learn about the Exploratorium and "visit" the museum from their school. office, or home.

There is a quote by Dr. Frank Oppenheimer that "art is included, not just to make things pretty, although it often does so, but primarily because artists make different kinds of discoveries about nature than do physicists or biologists.... Both art and science are needed to fully understand nature and its effects on people." One of the ways artists have been included here is through the artist-in-residence program. How are artists involved in the Exploratorium and what sort of projects have they done?

Our support is for artists trying to do something that is mutually of interest and generally trying to push their repertoire of things to do. Because we have technical resources we can help them learn things that they haven't been able to do, haven't had the resources to do.

It can be of mutual interest because art can show all sorts of phenomena that are otherwise hard to explain. We can have art here and a teacher can say, "This piece shows this phenomenon and this phenomenon, and the interactions between them." But you do not have to be specific about didactically teasing out exactly what's going on.

We have a piece called *AM Lightning* with RF gas discharge, which has little blobs of plasma moving back and forth in it. Why they do that is very sophisticated, and I am not even sure that it is fully known. But it is a nice thing to play with. So it's a piece of art. The person who did it is Bill Parker, a plasma artist, but his background is in physics and he consults on free-electron lasers and various things like that. But his primary interest is finding and displaying interesting phenomena for people to play with.

The strength of the artist-in-residence program, besides the particular interchange between us and the artist, is that it produces artifacts that are interesting and have some depth. One of the criteria for real art is that it is something you can keep coming back to, finding new things in it. Since we tend to be phenomenological, the art is not images of human beings doing things, but images of nature doing things. That is our particular bent. But because it is an art piece we don't have to explain it, and sometimes they are not explainable, per se. Not having to explain it gives us a freedom to show very complicated things.

The *Sun Painting*, by Bob Miller, was one of our earliest artist-in-residence pieces. That artist was actually on staff as associate director for many years. One of the things his exhibit shows is that we are not just covered with light, we are covered with images of things. They are overlapping images so they smear each other out and it looks like it is just light falling on us. What is falling on you tells you where the light is coming from, there is lots of information in this. He uses light in various relatively simple ways, but always does very nice things.

The Museum is twenty-five years old this year. We already talked a little about the nets, what else is in store for the next twenty-five years?

There is a publishing component that we are working on—there may be CD-ROMs in our future. Partly because you cannot shove everything over the networks.

Physically, there would hopefully be some expansion into the Presidio which will help make more space for exhibits. We are maxed out at the number of people we can get through this space. On the weekends you can only get about four or five thousand per day through this building.

We have hopes of becoming a national teachers' center, offering a degree for training teachers, helping in the reform movement in the teaching profession. While experiential learning, project-based learning, have been given lip-service in the educational establishment, these ideas have really galvanized teachers. And this is one of our major focuses. Going beyond just the phenomenological and the perceptual into the realms of cognitive learning opens up a lot of directions to be explored.

The networks look like an important way to go. It just depends on how the technology evolves, and what we can do with them. The hypermedia of the Web is a good beginning. There are many things that still need to be invented so people can surf the net and get to where they want to go. You should be able to experience it without the technology getting in the way.

Interactivity is the basis of experiential learning. You have to have interactivity at a relatively high rate. On television these days, in advertising you get a mini-story in fifteen seconds. Kids can take in data at that rate. It is based on common, human-level experiences that everybody is familiar with. So it can go faster than things that are less common. We have developed a visual language through television that allows things to happen relatively rapidly.

Teachers talk about "kids can't concentrate," not being able to stay on one thing. But if they are really engaged, and they are going in the direction of what they want to do, there is no attention problem. It is just when they can't go forward they go sideways. The attention is not going to stop because there is a barrier there. The interruption of not being able to figure something out is frustrating. For the most part that is what happens to kids in school. But if kids can keep asking questions and keep getting answers, and do it experientially, they will continue. You want to say, "You have this question, the answer to that is," "Why don't you put together this little experiment, that is the next step in the answer." Since it is doing something, the kids really like to do things…it is an active process.

You need to have interactivity and connectivity that is rich enough to support the various pathways. We have some excellent teachers who teach the teachers. They have really good raps as they interact with people while they are teaching the exhibits. Their raps on how you think about the particular phenomena are very good. We would like to make this available via the different media, and indexed in such a way that you can come into this discussion where you want; where they are talking about polarization and here is an example and you can do this and you can do that.

For teachers, suppose you have not taught polarization for three or four years and tomorrow you've got to teach polarization. Here is somebody with a coherent rap. Well, suppose you are a kid wanting to learn about polarization, here is a coherent rap. And it is essentially available on demand, this is part of what makes the networks alive. It is a tool for discovery, and self-discovery is really the core of it. You have to discover it for yourself. ■

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Special Exhibition

Black History Month
Museum Floor, Through February 28

This multi-faceted exhibition acknowledges the contributions of African-American scientists and inventors and includes the George Washington Carver Elementary School Mural, created by 120 third and fourth graders from Carver Elementary School, Hunter's Point. The mural's theme is African American scientists and inventors and includes George Washington Carver, scientist and inventor of three hundred uses for the peanut; Charles Drew, inventor of the plasma bag; Mae Jaminson, first female African American astronaut; and Garret Morgan, inventor of the gas hood and stop light. A video of the mural-making process, an interactive video where visitors can record their responses to what they've learned about black contributions to science, and ten interactive Exploratorium exhibits demonstrating discoveries by black scientists, will be on display. A Black Scientists and Inventors Pathway, highlighting these exhibits, accompanies the exhibition.

Black History Month Guest Lecture
NASA Aerospace Engineer Dr. Christine Darden
February 19
McBean Theater, 3pm

Dr. Christine Darden presents a public presentation on her work on the sonic boom, as well as the challenges and obstacles she's encountered as a black woman in the sciences. Dr. Christine Darden is Senior Project Engineer in the Advanced Vehicles Division at NASA Langley Research Center in Hampton, Virginia, where she serves as Leader of the Sonic Boom Group. Dr. Darden will also hold special meetings with youngsters from Hunters Point, MESA students, and a career workshop session with the Exploratorium's Explainers, a culturally diverse crew of high schoolers who act as the sole guides to the museum for the public.

Special Exhibition

MultiMedia Playground
Temporary Exhibition Area, Through March 6

If acronyms like CD-ROM make you wish that the 21st century would never arrive or if you feel intimidated by the explosion of possibilities in the fields of education, communication and entertainment, then the Multimedia Playground is the place for you. Park yourself at one of the ongoing workstations and roll up your sleeves. Dive into the world of CD ROM with the help of roving Explainers. Take your first guided tour through the Internet, or pack for a trip into virtual reality. The Multimedia Playground, a showcase of roadside attractions along the information highway, makes the latest advances in multimedia software accessible and approachable for techno-phobes and aficionados alike by providing selected multimedia and educational software titles available for test drives.

Among the interactive demonstrations in the Multimedia Playground is CitySpace, a part of a traveling Internet workshop called Internet Tours. CitySpace is a virtual city model built collaboratively by kids across the Internet, who share stories, pictures, sounds, and models of each others neighborhoods. The various contributions are then assembled into a navigable, three-dimensional city model. From March 7-11, kids aged 10-16 are welcome to come to the Exploratorium along with their teachers and parents to create new elements for the CitySpace model, working with their peers submitting elements via the network.

In addition, students are also invited to participate from remote areas by contributing elements and by logging into CitySpace's videoconferencing system to view the model as it develops and interact with other kids.

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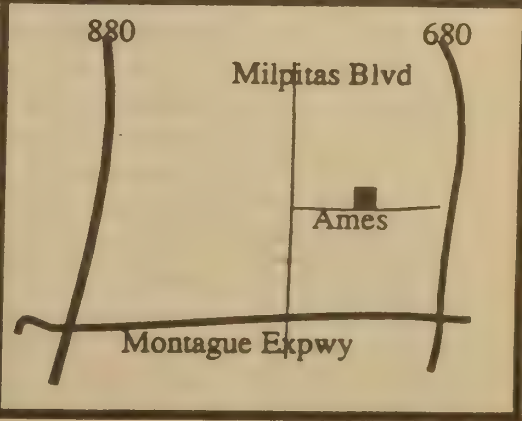


Special Book Excerpt From

The Internet Roadmap

Internet Access For The Armchair Explorer: Gopher

BY BENNETT FALK

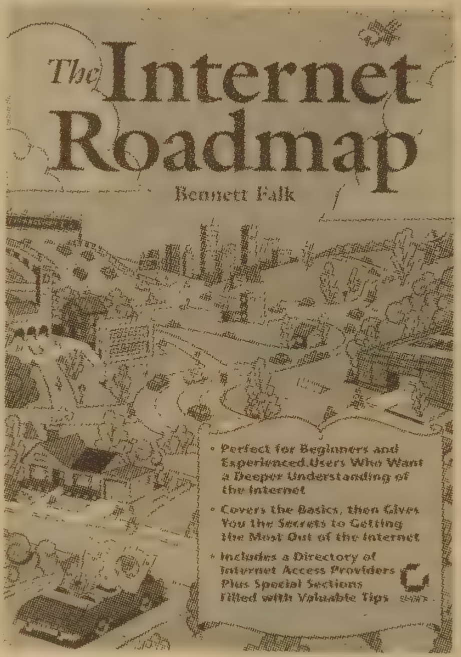
"Chloe, are you playing with that Internet thing again? do you have to spend so much time on that computer?" Chloe's mother Sarah stood in the doorway blocking the light from the hall. The 15-year-old spoke but did not look up. "It's not 'play,' mom, I'm learning things. You should try this sometime, you'd like it."

"I can't get interested in computers for their own sake, Chloe. If there were something of value, like a women's network or something, I might be interested." Sarah stepped into the room and sat on the bed. Chloe continued to look at the screen. "In a way, there is a women's network, you know," she said.

"On the computer? I didn't know that," Sarah replied. "Where is it?" Chloe gave a command, and a menu appeared on the screen listing topics by and for women. She moved aside and offered her mother the chair. "There," she said, "This menu goes on for twelve screens, and all the items on it are women's items."

Sarah scanned the menu. "Where did this come from?" she asked.

"It's from all over the Internet. I just asked to see all the items that have 'women' in the title. They aren't all winners, and some are duplicates. But when you weed out the things you know you don't want to see, you can find the really interesting stuff a lot faster." But Sarah had already selected an item and was skimming through the text of a recent speech delivered by the First Lady.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• Covers the Basics, then Gives You the Secrets to Getting the Most Out of the Internet
• Includes a Directory of Internet Access Providers Plus Special Sections Filled with Valuable Tips
SYBEX

WHAT GOPHER IS

If you are fascinated with the Internet's information resources but have a low tolerance for FQDNs, IP addresses, directory names, user names, passwords, and file types, the Internet **gopher** is the tool you've been waiting for. Technically, **gopher** is a "distributed document delivery system." Fortunately, it's much more appealing (and more fun to use) than that description makes it sound. In practice, gopher is something like an easy-to-use **ftp** without walls. That is, you can retrieve files via **gopher** without knowing which Internet host contains the file or what directory the file is stored in. The aim of the **gopher** application is to bring you information from all over the Internet as seamlessly as possible. Unlike any other application we've discussed so far, **gopher** doesn't require you to memorize a domain name or login information. You won't even have to remember which **gopher** server manages the information you want to retrieve. **Gopher** is so successful at hiding the boundaries between machines and servers that the term "Gopherspace" has been coined to refer to the complete pool of information resources managed by **gopher** servers throughout the Internet.

Because **gopher** is so easy to use, it has become an extremely popular vehicle for publishing information on the Internet. There are more than 750 **gopher** servers spread throughout the Internet. Many of these are devoted to specialized areas of interest. For example, there are at least five servers managing information on plant genome projects. Many businesses use **gopher** servers to reach the Internet audience. There is, for example, a **gopher** server for The New Republic. There are also **gopher** servers for nonprofit organizations and advocacy groups such as the Electronic Frontier Foundation (EFF). Apart from its advocacy work, the EFF **gopher** is host to a number of electronic periodicals that challenge the conventions of mainstream journalism. **Gopher** provides a congenial medium for these and many more activities.

Gopher was developed in 1991 at the University of Minnesota. The **gopher** development team there continues to work on enhancements and extensions of the system, and the UM **gopher** server remains the Mother Gopher. Unlike **ftp**, **telnet**, and **mail**, **gopher** is an application designed for the current state of the Internet. It assumes that there will be lots of users, that the users shouldn't be bothered by the details of managing client/server connections, that each connection from client to server should be as brief as possible, and that the physical network is fast enough to perform well even if the client program must open a connection for each query it sends to the server.

HOW GOPHER WORKS

When you run a **gopher** client program on an Internet host, it connects to a **gopher** server elsewhere on the Internet. By default, clients connect first to the Mother Gopher at the University of Minnesota, and from this connection you can maneuver from server to serve throughout the Internet. If you know that the resources you're after are managed by a different gopher, you can bypass the Mother Gopher entirely and make your initial connection to the **gopher** that manages the data you're interested in. To do so, you need to supply the fully qualified domain name of the server's host and the port it monitors for connections. Port 70 is usually reserved for **gopher** servers. To start a **gopher** session with the server at the University of Nevada at Reno, use this command:

```
gopher gopher.unr.edu 70
```

(The UNR **gopher** has a particularly rich **veronica** database. You may want to refer back to this address during the discussion of **veronica**.)

After a connection is established, the client asks the server for a short listing of the resources it manages. The server's resources are organized hierarchically, usually in a tree-like directory structure. The first listing a server sends is the root level of this directory hierarchy. The client program formats the listing into a menu and displays

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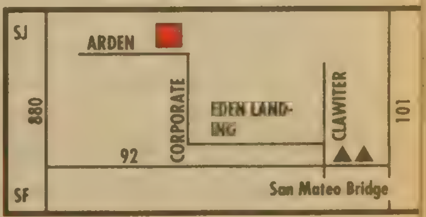

it on your screen. When you select an item from this menu, the client relays your choice back to the server, and the server does whatever is appropriate for that kind of item. If the item you selected is a directory, the server sends back a listing of that directory's contents, and the client presents that to you as a menu. If your selection is a file, the server will send the client the contents of the file. When the client receives a file, it checks the file type and does whatever is sensible for a file of that type. If the file is text, the client displays it, and after you've looked at it, you'll have the option of printing, mailing, or saving the file locally. If the file is binary, the client will prompt you for a file name to use when saving the file locally.

GOPHER MENUS AND THE OBJECTS BEHIND THEM

At first glance, you might think that **gopher** is just a tool for browsing through files and directories. After all, it recognizes six different kinds of files. When file selections appear in a menu, **gopher** indicates what kind of file (ASCII, Binary, DOS Binary, etc.) or directory the item stands for. As you rummage through **gopher** menus, however, you'll find that many of the menu items point to resources outside the **gopher** server you've connected to. The files and directories that menu items point to may be on another Internet host elsewhere. In fact, a menu item on one **gopher** server may point to resources under another **gopher's** control. Some **gopher** servers contain no data at all, only links to other **gopher** servers. Your client program will deal equally well with both servers, and unless you ask for technical information about the menu item, you won't know which **gopher** server the resource is really located on.

table 6.1: Gopher Objects, their Identifiers, and Icons

MENU ITEM TYPE	GOPHER IDENTIFIER	ICON
File	0	-none-
Directory	1	/
BinHexed Macintosh File	4	<HQX>
Uuencoded file	6	-none-
DOS Binary file	5	<PC Bin>
Binary file	9	<Bin>
Graphics File in GIF Format	g	<Picture>
Image File	i	<Picture>
Index Search	7	<?>
Telnet Session	8	<TEL>
Telnet 3270 Session	T	<3270>
CSO Phone-book Server	2	<CSO>
Error	3	-none-

listing 6.1:
A Sample gopher Menu Showing Different Item Types

```
                 Internet Gopher Information Client 2.0

                                Sample  Menu

-->   1.  Plain File.
      2.  Listing of /tmp Directory  /
      3.  CSO phone-book server <CSO>
      4.  Macintosh BinHexed file <HQX>
      5.  DOS Binary File <PC Bin>
      6.  Index Search <?>
      7.  Telnet Session to optimism <TEL>
      8.  Binary  File <Bin>
      9.  Telnet to 3270-based host <3270>
      10. Graphics file in GIF format <Picture>
      11. Image file <Picture>
```

Some **gopher** menu items are not files at all, but gateways to programs or to other application (that is, non-**gopher**) servers. Through a gateway menu item you could trigger a **telnet** session from your local computer to another machine across the Internet or request a keyword search on the contents of the current directory. A **gopher** menu item can represent any of a dozen different things, and most **gopher** menus include icons indicating what type of object each item represents. Internally, **gopher** uses single-character identifiers to name each object type. Most of the time the identifiers are safely out of view, but, as you'll see later, when you ask for information about an item, **gopher** displays the identifier without telling you what it stands for. The list of **gopher** objects, their identifiers, and icons appears in Table 6.1.

A few of the objects **gopher** recognizes may be new to you. **Telnet** 3270 is a special implementation of the **telnet** program to connect to IBM computers that use the 3270 "block mode" terminal. A CSO Phone-book Server is a tool for maintaining a campus-wide phone directory. Index Searches are used to retrieve files containing keywords that you specify. **Gopher** provides an interface to index searching tools of various kinds. One popular indexing and retrieval tool on the Internet is the Wide-Area Information Server (WAIS). WAIS itself isn't discussed in this book, but you don't need to know about WAIS in order to query WAIS indexes through **gopher**. Index searches are discussed in more detail later in this chapter. A sample menu showing menu items with icons appears in Listing 6.1.

GETTING PREPARED TO USE GOPHER: WHAT YOU'LL NEED

To use **gopher**, all you need is Internet access and a **gopher** client program to run on the computer that provides your Internet connection. If you're working on a UNIX system and using the terminal-based version of the **gopher** client (as opposed to the version for a graphical user interface like Xwindows), you'll need to know what kind of terminal you're using. **Gopher** is a "full-screen" application, and it needs to know some features of the terminal you're working on. On many Internet hosts, your terminal type will be set for you automatically when you first log in. If your terminal type can't be determined automatically, the system may ask you for a terminal type as part of the login procedure. In any case, if the display is scrambled when you run **gopher**, you'll still be able to quit the program by typing Ctrl-C. After **gopher** exits, you can change the terminal type.

listing 6.2:
The Mother gopher's Root Menu

```
         Internet Gopher Information Client v1.11

         Root gopher server: gopher.tc.umn.edu

 -->   1.  Information About Gopher/
       2.  Computer Information/
       3.  Discussion Groups/
       4.  Fun & Games/
       5.  Internet file server (ftp) sites/
       6.  Libraries/
       7.  News/
       8.  Other Gopher and Information Servers/
       9.  Phone Books/
      10.  Search Gopher Titles at the University of Minnesota <?>
      11.  Search lots of places at the University of Minnesota  <?>
      12.  University of Minnesota Campus Information/
```

Unlike **ftp**, **telnet**, and **mail**, **gopher** is not bundled with any commercially available operating system or network software. Consequently, there may be no **gopher** client installed in the computer that provides your Internet access. The surest way to test this on a UNIX system is to issue the **gopher** command. If you get the message "Command not found," try again, but this time add the path name **/usr/local/bin**, the directory that most UNIX systems use for locally installed software:

/usr/local/bin/gopher

If this fails and you get the same message, ask the system administrator if

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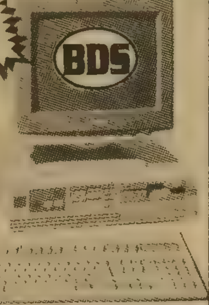

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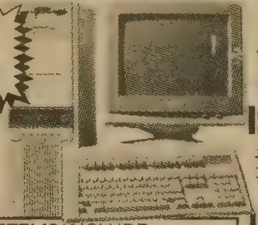

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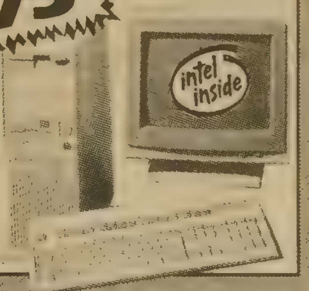

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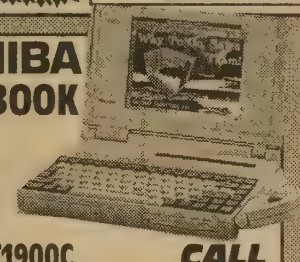

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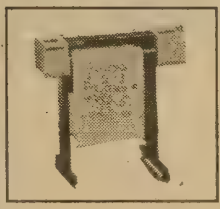

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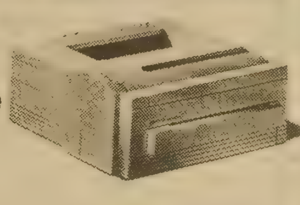

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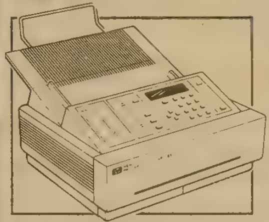

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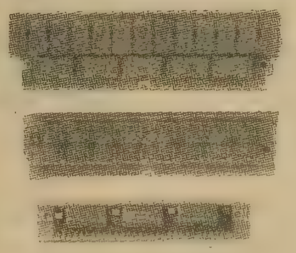

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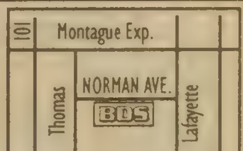

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gopher is installed and what the appropriate command is to run a **gopher** client. If **gopher** is not installed, you can get a copy from the University of Minnesota via anonymous **ftp**. If you're working on a UNIX system, you'll need to retrieve the source code for **gopher** and compile it. Novices shouldn't try to do this without help. If a personal computer provides your point of contact with the Internet, you can retrieve an already compiled client program.

If you're unable to install a **gopher** client on the computer that connects you to the Internet, **gopher** is also available via **telnet**. Table 6.2 lists some of these sites and the information needed to connect to them. **Telnet** to the host nearest you and use the login name for that host from the table. The list of sites that offer **telnet** access to **gopher** clients is subject to change. Consult Yanoff's Internet Services List (Chapter 3 shows how to get there) for sites added recently.

USING GOPHER

When you run a **gopher** client and connect to the Mother Gopher at the University of Minnesota, you'll see the menu in Listing 6.2. You can select a menu item by typing its number or you can move the cursor to the desired item with your terminal's arrow keys. Pressing Return will select the item, and the item type will determine what **gopher** does next. Typing a **?** will display a summary of the commands that can be executed from a **gopher** menu. Listing 6.3 shows the **gopher** help message.

listing 6.3: Gopher Command Help

```
                        Quick Gopher Help
                        -----------------

Moving around Gopherspace
--------------------------
Press return to view a document

Use the Arrow Keys or vi/emacs equivalent to move around

Up ..................:  Move to previous line.
Down ................:  Move to next line.

Right Return ........:  "Enter"/Display current item.
Left, u  ............:  "Exit" current item/Go up a level.


>, +, Pgdwn, space ..:  View next page.
<, -, Pgup, b .......:  View previous page.

0-9 .................:  Go to a specific line.
m   .................:  Go back to the main menu.

Bookmarks
---------
a : Add current item to the bookmark list.
A : Add current directory/search to bookmark list.
v : View bookmark list.
d : Delete a bookmark/directory entry.

Other commands
--------------
s : Save current item to a file.
D : Download a file.
q : Quit with prompt.
Q : Quit unconditionally.
= : Display Technical information about current item.
O : change options.
/ : Search for an item in the menu.
n : Find next search item.

The Gopher development team hopes that you find this software useful.
If you find what you think is a bug, please report it to us by sending
e-mail to "gopher@boombox.micro.umn.edu"
```

listing 6.4: Getting Information About a gopher Menu Item

```
Name=Information About Gopher
Type=1
Port=70
Path=1/Information About Gopher
Host=gopher.tc.umn.edu
```

Most of the time, you will not need any additional information about the items in a **gopher** menu. However, if you want to see the access information **gopher** has about an item, position the cursor on that item and press the = key. Listing 6.4 shows what **gopher** reports when you ask for information about an item. In this example, we asked for information about the first item in the Mother Gopher's Root Menu. **Gopher** tells us the item's name, its type (type 1 items are directories), the path for getting to the object and a host name and port number that can be used to find the object.

With a terminal-based **gopher** client, there is usually room for 18 menu items on a single screen, and it is common for **gopher** to present directory listings that span several screens. In the lower-right corner of the display, **gopher** shows both the current page and the number of pages for the directory being listed. You can move your view of the listing forward and backward a page at a time with the > and < keys. Notice that moving from page to page in one listing is different from going up to the parent menu (with the **u** command).

Another tool for searching through multi-page menus is the / command, which searches for a word or string in the names of the menu items in the current listing. Remember that the / command searches for the keyword only in the names of the menu items. Searching the contents of menu items requires an "index Search" menu entry and a full-text index.

CREATING GOPHER MENUS AD HOC

One of the most powerful features of the **gopher** software is that you can dynamically create new menus that combine items from various other menus. There are three tools that make this possible: bookmarks, index searches, and **veronica. Gopher's** bookmark capability allows you to maintain a list of **gopher** menus that you visit frequently. At any time during a **gopher** session, you can retrieve this list and use it as you would any other menu. Bookmarks and information about them are managed by the **gopher** client program. **Veronica** is a database that contains the names of menu items in all the **gopher** servers that can be reached from the University of Minnesota **gopher**. You query the **veronica** database from a **gopher** menu item that prompts you for keywords. Menu item names that contain your keywords are returned to you as a menu. Finally, index searches enable you to query a **gopher** server for files that contain a keyword you specify. Keyword searches are only possible on files that have been indexed, so you'll have to depend on whoever maintains the files to provide an index and a menu item that allows you to submit queries. Let's look at each of these features in greater detail.

BOOKMARKS IN GOPHER

Navigating through directories one level at a time using menus is easy but tedious. If there are **gopher** menus that you use frequently, bookmarks are a way to relieve the tedium. **Gopher** bookmarks are shortcuts that take you directly to the desired menu or item without winding through all its parent menus.

When you locate a menu item that you know you'll want to visit again, simply position the cursor on that item and type **a** to add the item to your list of bookmarks. To add a bookmark for the current directory, use **A**. Doing this will add access information for the current item to a local file that stores the configuration of your **gopher** client. (On UNIX systems this file is named **.gopherrc**.) You can view a list of your bookmarks by typing **v. Gopher** will present the bookmarks to you as a menu, and you can move to any item by simply selecting it. If you want to delete a bookmark from the list, first issue a **v** command to display the list. Position the cursor on the item to be deleted and type **d.** Because bookmarks are stored in your local configuration file, they are present whenever you start a **gopher** session.

VERONICA: AN INDEX TO GOPHERSPACE

Veronica stands for "Very Easy Rodent-Oriented Net-wide Index to Computer Archives." It performs for gopher the same service that archie provides for **ftp** archives: it is a searchable index of the titles of menu items on **gopher** servers throughout the Internet. **Gopher** has become an immensely popular tool for publishing information in the Internet community. However, as more **gopher** servers have come online, the job of searching through **gopher** menus to find what you're looking for has become more complicated. **Veronica** is an application that maintains a database of menu item titles from any **gopher** server that can be reached from the Mother Gopher at the University of Minnesota. There are veronica databases at a number of different sites, and their contents vary

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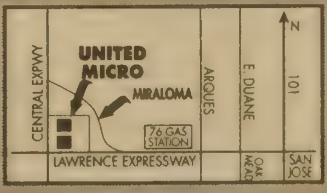

*Identical Items Only

listing 6.5:

Searching the veronica Database

```
                    Internet Gopher Information Client v1.11

                        Search gopherspace using veronica

         1.  Search gopherspace at NYSERNet <?>
     --> 2.  Search gopherspace at UNR <?>
         3.  Search gopherspace at PSINet <?>
         4.  Search gopherspace at University of Pisa <?>
   +------------Search gopherspace at UNR-----------------+
   |                                                      |
   | Words to search for  small business                  |
   |                                                      |
   |                     [Cancel ^G] [Accept - Enter]     |
   |                                                      |
   +------------------------------------------------------+


Press ? for Help, q to Quit, u to go up a menu    Page: 1/1
```

listing 6.6:

Results of a veronica Query

```
              Internet Gopher Information Client v1.11

              Search gopherspace at UNR: small business

 --> 1.  R4: NCI-CM-27729-72 PRECLINICAL TOXICOLOGY AND PHARMACOLOGY
OF D
     2.  NCI-CM-27729-72 PRECLINICAL TOXICOLOGY AND PHARMACOLOGY OF
DRUG
     3.  At the Small Business Development Center, Academe Gets Down
to Bus
     4.  nsf9318     - NSF 93-18 - Small Business Innovation Research
(SBIR
     5.  sei91414    - 4-14  Small Business Innovation Research
(SBIR) awar
     6.  sei91414.wk1- 4-14  Small Business Innovation Research
(SBIR) awar
     7.  sei91415    - 4-15  Small Business Innovation Research
(SBIR) awar

     8.  sei91415.wk1- 4-15  Small Business Innovation Research
(SBIR) awar
     9.  DOE Small Business Innovation Research Grants.
     10. Food and Agricultural Sciences Small Business Innovation Res.
     11. DOD ONR Small Business Innovative Research Program.
     12. Digestive Diseases and Nutrition Small Business Innovation R.
     13. Defense Life Sciences Small Business Innovation Research.
     14. Space Life Sciences Small Business Research.
     15. Small Business Development Centers.
     16. Western Virginia Small Business Development Consortium.
     17. Hirshber -- ERIC Review: Enterpreneurship and Small Business
Devel.
     18. Community-Development-and-Small-Business/
```

somewhat. You may need to query more than one of these to find the information you're looking for.

Veronica databases are queried from a **gopher** menu. The menu item you select to begin a **veronica** search has the same icon as other index searches (<?>). Listing 6.5 shows the screen that prompts for keywords in a **veronica** query. In this example, we're querying the **veronica** database at the University of Nevada at Reno (UNR). The menu from which we're querying provides access to several different **veronica** servers and allows you to set the scope of the query. A query of gopherspace will return menus of any type. You can choose a menu item that only looks for a match in **gopher** menu items that point to directories. Directory queries generally return faster, but querying all of gopherspace will give you a more detailed picture of what is available. The prompt for keywords reminds you of which type of query you selected. To query for menu item titles that contain the words "small" and "business," you simply type those words and press Return. The results of this query will be displayed as a menu, and the first page of the result menu is shown in Listing 6.6. This query produced enough menu items to require six menu screens. (The first two menu items returned by **veronica** have long titles that are truncated and don't look like they have anything to do with small business. In fact both are Requests for Proposals (RFPs) that are classified as "Small Business Setasides."

INDEX SEARCHES

Like any other menu-based system, **gopher** makes your access to information easier by giving you a clear view of your choices at every step of the way. Often, however, you will have only the names of the menu items to guide you in making selections from **gopher** menus, and you'll have to do a lot of browsing to find what you want. If the group of files you're interested in has been indexed, you can use the index to identify files that contain the keywords you specify. Usually you will be dependent on whoever publishes the files to provide an index.

When you're using the terminal-based **gopher** client, index searches appear as menu items with the "<?>" icon. The name of the menu item usually indicates what files the index covers. After you select an index search item, **gopher** will prompt you for keywords to be looked up in the index. When you press Return, the **gopher** server will search the index for your keywords and build a menu in which each item points to a file containing your keywords. If you specify several keywords, most indexes searchable through **gopher** will count a file containing any of the words as a successful match. If nothing in the index matched your keywords, the result menu will contain an item saying there were no matches. It may also contain items describing the contents of the index or suggestions for phrasing queries effectively.

FURTHER INTO GOPHERSPACE

A little **gopher** knowledge will go a long way. You've learned the basics of starting a **gopher** client and probing for information with menus, bookmarks, the **veronica** database, and index searches. Once you're comfortable with using **gopher** to find Internet resources, you may find that **gopher** is the ideal tool for producing an information resource of your own and publishing it for the Internet community. Setting up a **gopher** server is only slightly more complicated than using a **gopher** client. To learn about creating **gopher** servers or to develop more advanced skills using **gopher**, you'll need some additional documentation.

Documentation on the Internet comes in many forms. There are FAQs (compilations of Frequently Asked Questions) about many topics. FYIs (For Your Information bulletins) and RFCs (Request for Comment) are generated to inform the Internet community of (and invite commentary about) proposed standards. In the USENET Net News there are open forums about a wide range of topics. **Gopher** documentation comes in all of these forms. There is a **gopher** FAQ that is updated periodically. Information about the design of **gopher** and the **gopher** protocol can be found in RFC 1436. And **gopher** is the subject of a USENET newsgroup named **comp.infosystems.gopher**.

These disparate sources of information are collected in a single menu item titled "Information About Gopher" on the Mother Gopher in Minnesota. (This is the first menu item on the Mother Gopher's root menu. The contents of the"Information About Gopher" menu are shown in Listing 6.7. A separate FAQ for **veronica** is maintained at the University of Nevada at Reno and is available via **gopher**. Finally, if you're working on a UNIX system that has the **gopher** client software installed, the first place to look for help is the on-line manual. Type **man gopher** to see the manual entry for the client program. If the **gopher** manual pages have not been installed, you'll get the message "No manual entry for gopher." ■

listing 6.7:

the information about gopher menu

```
Internet Gopher Information Client v1.11


Information About Gopher


--> 1.  About Gopher.
2.  Search Gopher News <?>
3.  Gopher News Archive/
4.  comp.infosystems.gopher (USENET newsgroup)/
5.  Gopher Software Distribution/
6.  Gopher Protocol Information/
7.  University of Minnesota Gopher software licensing
policy.
8.  Frequently Asked Questions about Gopher.
9.  Gopher+ example server/
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11. New Stuff in Gopher.
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13. big Ann Arbor gopher conference picture.gif <Picture>
```

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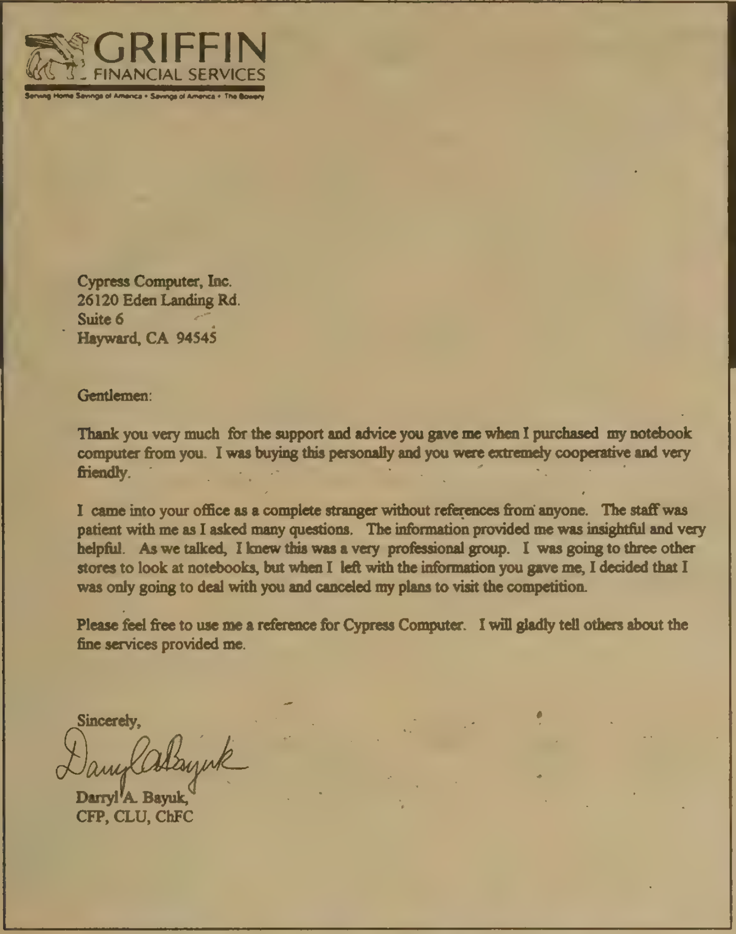

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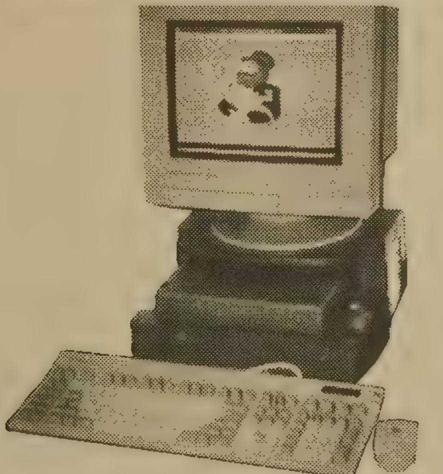

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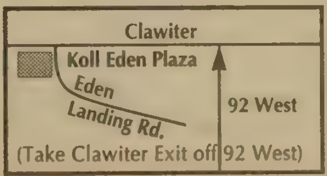

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- 486 AIR-EI EISA 8-Slot VLB 256K Cache Motherboard
- 16MB 70ns 72Pin SIMM RAM
- Access Fast Adaptec SCSI-2 VLB Controller
  with VLB IDE, FD and 2S/1P/1G
- 1.2M & 1.44M TEAC Floppy Drives
- 540MB Quantum Fast Wide SCSI-3 LPS540S HD
- Toshiba XM 3401B SCSI-2 256K CD-ROM
- Diamond Viper VLB 2MB VRAM Weitek 9000 ChipSet
- KFC 17" 1280X1024NI Multisync Digital Monitor
- Premium Digital Full Tower 250W PS
- 101 Keytronic Keyboard

33SX-$3532 **50DX/2-$3693**
33DX-$3676 **66DX/2-$3867**
40DX-$3676

Advanced Integration Research, Inc

READY TO GO

8 full EISA bus-mastering slots with 3 VLB extension, memory upgradeable to 256MB using 72Pin SIMM, ZIF socket for easy CPU insertion & removal and future P5 Overdrive support, U.S. made quality motherboard. Compare this to AMI or Micronics and you see no reason to spend five hundred dollars for just the name! We add Viper VLB to make this machine fly even higher!

Add and subtract to make your dream machine!

Multimedia CD Titles

No	Description	Price
002	WING COMMANDER & ULTIMA VI	$18
003	SO MUCH SHAREWARE II	$22
004	MS BOOKSHELF	$36
005	SLEEPING BEAUTY	$17
006	COMPTON'S ENCYCLOPEDIA (MPC)	$47
008	DICTIONARY OF LIVING WORLD	$22
009	ARTHUR'S TEACHER TROUBLE	$22
010	BARNEY BEAR GOES TO SPACE	$17
011	BEAUTY & BEAST	$17
012	MACMILLAN DICTIONARY CHILDREN	$24
013	MIXED UP MOTHER GOOSE	$15
014	CARMEN SAN DIEGO - DELUXE	$22
015	JONES IN THE FAST LANE	$14
016	PLAYING W/ LANGUAGES - ENGLISH	$22
018	MARIO'S MISSING/ WORLD ATLAS	$23
019	MAYO CLINIC FAMILY HEALTH BK	$23
020	NATIONAL GEOGRAPHIC MAMMALS	$22
021	REFERENCE LIBRARY BY STW	$21
022	CHESSMASTER 3000 MPC	$16
023	KINGS QUEST V	$14
024	SPACE QUEST IV	$16
025	STELLAR SEVEN	$17
026	ALL BEAUTIES	$23
028	GIRLS OF VIVID VOL. 1.0	$39
029	GIRLS OF VIVID VOL. 2.0	$39
031	ABOUT COWS	$26
032	ADVENTURE OF WILLY BEAMISH	$17
033	AIRCRAFT ENCYCLOPEDIA	$29
034	AMER BUSINESS PHONEBOOK 1992	$17
035	AMERICAN VISTA	$29
036	ANIMALS ENCYCLOPEDIA MPC	$29
037	ARCADE BATTLES	$19
038	ARIS JETS & PROPS 2 DISKS	$22
039	ARIS WILD PLACES	$13
040	ARIS WIZARD TEST AND TUNE UP	$18
041	ARIS WORLD VIEW	$13
042	AUDUBON BIRDS	$19
043	AUDUBON MAMMALS	$18
044	BARNEY BEAR GOES TO SCHOOL	$17
045	BARRON'S COLLEGE GUIDE	$22
047	BEETHOVEN BY MICROSOFT - DISTI	$57
048	BRAIN DRAIN	$17
049	BUS. & ECON. WORLD ATLAS	$23
050	BUSINESS BACKGROUND	$39
051	BUSINESS MASTER	$21
052	CALIFORNIA COLLECTION	$17
053	CAREER OPPORTUNITIES	$29
054	CHESS MANIA	$41
055	CICA WINDOWS	$16
056	CINEMANIA BY MICROSOFT - DISTI	$57
057	CLIP ART HEAVEN	$25
058	CLIPART GOLIATH	$19
059	COLOSSAL COOKBOOK	$18
060	COMPLETE BOOK SHOP	$18
061	COMPOSER QUEST	$22
062	CONSUMER INFORMATION	$29
063	COREL ARTSHOW 3	$61
065	CROSSWORD CRACKER	$23
066	DESERT STORM	$22
067	DINOSAUR ADVENTURE	$22
068	EDUCATION MASTER	$22
069	ELECTRONIC LIB OF ART VI	$26
070	ENCARTA BY MICROSOFT - DISTI	$265
071	COREL DRAW V4.0	$259
072	EUROPEAN RACER BY REVELL	$55
073	FAMILY CHOICE	$19
075	FAMILY DOCTOR MPC	$19
076	FAMILY EDUCATION COLLECTION	$22
077	FONT MASTER I	$19
078	FONT MASTER II	$22
079	FUTURA GAMES	$18
080	GAME MASTER	$19
081	GAME PAK I	$23
082	GAME PAK II	$33
083	GIFS GALORE	$16
084	GREAT CITIES VOL. 1.0	$15
085	GREAT CITIES VOL. 2.0	$16
086	GUINESS DISC MPC 1993	$23
088	INDIANA JONES FATE ATLANTIS	$48
089	KGB WORLD FACT BOOK	$32
090	KILLER TRACK CD-MUSIC LIB	$17
091	KODAK PHOTO ACCESS	$18
092	LET'S PLAY	$18
093	LIBRARY OF THE FUTURE 1ST	$41
094	LOOM	$18
095	LOVELY LADIES	$33
096	MAGAZINE RACK	$26
097	MANHOLE	$34
098	MANTIS EXPERIMENTAL FIGHTER	$17
099	MAVIS BEACON TYPING 2.0 MPC	$21
101	MIRROR MIRROR	$19
102	MONKEY ISLAND - ENGLISH	$17
103	MUSICAL INSTRUMENTS	$62
104	NATIONAL PARKS	$23
105	NITE OWL'S	$33
106	NORTH AMERICAN FAX BOOK	$31
107	OCEAN DIGITAL IMAGERY VOL. 1.0	$29
108	OLDIES BUT GOODIES	$18
109	OS/2 ARCHIVES	$17
110	OUR SOLAR SYSTEM	$15
111	PACIFIC ISLAND	$38
112	PC MEDIC	$27
113	PC SIG 11 SHAREWARE	$16
114	PC SIG 12 SHAREWARE	$21
115	PETER AND THE WOLF	$17
116	PHOENIX 3.0 SHAREWARE	$18
117	PLAYING W/ LANGUAGES/FRENCH	$22
118	PLAYING W/ LANGUAGES/GERMAN	$22
119	PLAYING W/ LANGUAGES/JAPANESE	$22
120	PLAYING W/ LANGUAGES/SPANISH	$22
121	PRO PHONE 1993	$114
122	PROGRAMMER'S ROM	$28
123	PUBLISH IT! 2.0	$15
124	ROGER EBERT'S MOVIES COMPANN	$31
125	SAN DIEGO ZOO/ANIMALS	$19
126	SECRET WEAPON OF LUFTWAFFE	$21
127	THE SEVENTH GUEST - VIRGIN	$42
128	SFX 300 SOUND EFFECTS	$15
129	SHAKESPEARE	$15
130	SHAREWARE BONAZA	$43
131	SHAREWARE GOLD VOL 2.0	$43
136	SHERLOCK HOLMES VOL 2.0	$66
137	SHERLOCK/ CONSULT DET	$20
138	SIMTEL MSDOS SHAREWARE	$17
139	SO MUCH SCREENWARE	$28
140	SPACE ADVENTURE	$21
141	SPACE SERIES APOLLO	$30
142	SPEEDWAY	$61
143	STORYTIME	$21
144	STW GROLIER'S ENCYC. MPC	$43
145	SWIMWEAR 1993	$29
146	TEMPRA KODAK ACCESS S/W	$18
147	TERRORIST GROUP PROFILES	$43
148	TIME ALMANAC 1991	$24
149	TIME TABLE OF HISTORY - SCIENCE	$19
151	TRUE TYPE EXPLOSION FONTS	$22
154	U.S. HISTORY	$17
155	U.S. WORLD ATLAS PACK	$20
156	U.S.A. STATE FACT BOOK	$31
157	VARIETY STORE	$18
158	VGA SPECTRUM SOUND LIBRARY	$16
159	WIZ-PAK SHAREWARE	$15
161	WORLD ATLAS MPC	$16
162	WORLD OF FLIGHT	$29
163	WORLD OF TRAINS	$29
164	WORLD VISTA	$28
166	ANIMATED FANTASIES VOL. 2.0	$31
167	BEST OF VIVID	$45
168	HOT PIX ECSTASY	$35
172	HOUSE OF SLEEPING BEAUTY	$47
178	SOUTHERN BEAUTIES	$48
179	WOMEN OF VENUS	$30
180	101 SEX POSITION VOL.1	$48
181	101 SEX POSITION VOL.2	$48
182	CLIPMASTER PRO	$33
184	BUSTY OF BABES	$30
188	AFTER DARK TRILOGY	$52
189	LEGEND OF KAMASUTA	$48
191	DIGITAL DREAMS	$40
192	BUSTING OUT BY VIVID	$50
193	LOTUS 123 WIN SHAREWARE	$79
194	MS WINDOWS 3.1 SHAREWARE	$55
195	KEY FONTS PRO	$65
196	MS WORKS FOR WINDOWS	$42
198	SO MUCH SHAREWARE III	$22
199	WHO KILLED SAM RUPERT	$18
200	MICROPROSE 4 TITLE PAK	$23
201	MANIAC MANSION DAY - TENTAC	$47
202	COMPTON'S INTERACTIVE ENCYC.	$89
203	SOUND LIBRARY	$13
204	SUPER FONTS	$16
205	DR. FUN PAK	$19
206	DR. GAMES VOL.1	$15
207	DR. MUSIC VOL.1	$15
208	DR. SHAREWARE VOL.1	$15
209	DR. WINDOWS SHAREWARE VOL.1	$15
210	BATTLE CHESS ENHANCED	$24
211	RETURN TO ZORK	$29
212	ELVIS KARAOKE	$25
213	BUSTY OF BABES VOL. 2	$30
214	KINGS QUEST VI	$23
215	JUST GRANDMA AND ME	$24
216	ECOQUEST	$46
217	DAGGER OF AMON RA	$23
218	STAR WARS CHESS	$20
219	REBEL ASSAULT	$34
220	ADVENTURES IN HEAVEN	$23
221	BIBLE LIBRARY BY KING JAMES	$25
222	BIBLES AND RELIGION	$16
223	CAL.HAWALL GOLF GUIDE & GAME	$23
224	CHAOS AND FRACTULES	$29
225	COOKBOOK HEAVEN	$18
226	COOKBOOK - JIHN SCHUMACHER'S	$29
228	DESKTOP PUBLISHER DREAM DISK	$33
229	DR GAMES FOR WINDOWS	$18
230	DUNE	$25
231	ELECTRONIC HOME LIBRARY	$23
232	EUROPEAN MONARCH	$31
233	F117A STEALTH FIGHTER	$31
234	FONT FUNHOUSE	$35
235	FRACTOOLS	$29
236	FRESH ARTE	$29
237	FUN HOUSE	$22
239	GAMES EXPERT FOR WINDOWS	$14
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241	GUNSHIP 2000	$28
242	GUY SPY	$23
243	HACKER CHRONICIES	$25
244	HAM RADIO QRZI	$17
245	INCA	$24
246	LEARNING HEAVEN	$21
247	LEGEND OF KYRANDIA	$29
248	MAD DOG McCREE	$43
250	MONEY, MONEY,MONEY	$19
251	NORTH AMERICAN INDIANS	$29
252	OCEAN BELOW	$23
253	OFFICER'S BOOKCASE	$29
254	PLANT DOCTOR	$29
255	PHOENIX 4.0 SHAREWARE	$19
256	POWER PAK GOLD	$23
257	PRESCRIPTION DRUGS	$29
258	PUBLIQUE ART	$29
259	PUBLISHER S PARADISE	$24
260	PUBLISHER S POWER HOUSE	$23
261	STRAIGHT FROM HEAVEN	$22
262	STRUCK BY LIGHT	$25
263	STW 4 TITLE PAK	$29
264	STW GROLIER'S ENCYCLOPEDIA 6.0	$45
265	SUPER CLIPART	$16
267	SUPER GAMES FOR DOS	$18
268	SUPER GAMES FOR WINDOWS	$15
269	SUPER PROGRAMMER	$18
270	SUPER SHAREWARE LIBRARY	$19
271	SUPER SHEREWARE LIBRARY II	$19
272	SUPER WINDOWS SHAREWARE	$18
273	SUPER WINDOWS SHAREWARE II	$18
274	UP ALL NIGHT	$23
275	U.S. ATLAS	$17
276	U.S. PRESIDENTS	$29
277	VGA SPECTRUM	$23
278	WINDOWS MASTER	$24
279	WINDOWS PLATINUM	$23
280	ADULT PALATE	$39
281	AMERICAN GIRLS	$39
282	DIGITAL DANCING INTERACTIVE	$49
283	DIRTY TALK	$42
284	FOXES	$35
285	GORLS OF J.STEPHEN HICKS	$39
286	HIGH VOLUME NUDES	$38
287	L.A. STRIPPERS	$45
288	LEGENDS OF PORN	$45
289	MYSTIC OF THE ORIENT	$45
290	NEW MACHINE SAMPLER	$22
291	NEW WAVE HOOKERS	$42
292	NIGHT WATCH INTERACTIVE	$49
293	PHONE SEX-WINDOWS	$26
294	PHOTO GROUP I	$36
295	Q69	$45
296	SUPER SMUTWARE	$34
297	TRACY LORDS I LOVE YOU	$38
298	VOLCANO	$35
299	WICKED-THE MOVIE	$49
300	WILD WOMEN	$34
301	SHAREWARE HEAVEN	$19

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Fax: 510-226-6758
Mon to Sat 9:00AM-6:00PM PST

VISA ATM COD

☑ Free Local Area Delivery for System Purchase
☑ 1 Year Parts** and Life Time Labor Warranty
☑ Expertise LifeTime Technical Support
☑ 30 Day Money Back Compatiblity Guarantee on Systems

UMiracle

* Systems marked with "READY TO GO" are ready to be picked or delivered within 30 minutes - Please allow more time for minor configuration changes.
**Most components come with over 1 year warranty - first year will be covered by UMiracle [illegible]

es - sell computers and you got lots of choices, right?

UMiracle 486 ISA PCI

READY TO GO

UMiracle

- UMiracle 486 PCI 256K Cache Motherboard with 3 PCI, 4 ISA slots, Intel Saturn ChipSet with onboard NCR PCI SCSI-2, IDE, FD, I/O
- 8MB 70ns 72Pin SIMM RAM (8MB x 1pc)
- 1.2M TEAC & 2.88M Toshiba Floppy Drives
- 540MB Quantum Fast Wide SCSI-3 LPS540S HD
- NEC 3Xi Triple-Spd 450KB/S 190ms SCSI-2 CD-ROM
- Diamond Viper PCI 2MB - 85 Million WinMarks
- KFC 15" 1280x1024NI 0.28DP Multisync Digital Monitor
- Premium Digital Medium Tower 230W PS
- 101 Keytronic Keyboard

33SX-$2952 50DX/2-$3113
33DX-$3096 66DX/2-$3287
40DX-$3096

Highly recommended by our engineer staffs. Our fully integrated PCI motherboard combines PCI SCSI-2, IDE, I/O, supporting 2.88MB,Dollas battery, 72Pin SIMM upto 128MB. Our thorough testing ensures this PC is perfect and optimized in every aspects - including Fast-Wide SCSI-3 HD capable of 4MB/S substained DTR, Fastest Video, CD-ROM! Ready for any graphic or scientisfic intensive work!

Wrong! You have only one choice, if you want it to be a smart choice! Building a PC is not merely putting parts together and booting to a prompt. To achieve the optimized performance from a cost effective point of view, you need to know exactly how each component behaves, understand their characteristics and compatibility. At UMiracle, we keep searching and testing everyday. When you want latest (and working) technology at the best price, you have only one choice! Precise no-guessing price quotation, with latest product choices, technical expertise, thorough hardware testing, on-time delivery. You can compare, but you will ultimately come to us. Guaranteed!

UMiracle 486 ISA VLB

UMiracle

READY TO GO

- 486 ISA VLB 256K Cache Motherboard
- 4MB 70ns SIMM RAM (1Mx3 SIMMx4)
- Promise DC2000 32Bit VLB IDE Controller with 2S/1P
- 1.2M & 1.44M Teac Floppy Drives
- 270MB IDE Quantum LPS270A 128K Cache HD
- Cirrus Logic VLB 1MB Windows Accelerator
- 14" 1024X768I 0.28DP Monitor
- Premium Digital Mini Tower 230W PS
- 101 Key Enhanced Keyboard

33SX-$1159 50DX/2-$1320
33DX-$1303 66DX/2-$1494
40DX-$1303

Don't just blindly look for lowest price! It makes no sense to buy an VLB system without harddisk controller and video card on VLB. You aren't taking the advantage of the VLB! Be careful, from time to time, you would see ads selling cheap VLB without real controller and video card. Don't take the bait! Or you end up losing money to upgrade.

Components/Upgrades

[illegible]	
386/486 ISA 128K - 386/486 CPU support	$100
486 ISA VLB 256K - 3 VLB slots P24T support	$110
486 AIR-SH Green ISA VLB 256K - 3 VLB slots Upto 32MB, ZIF, P24T support, bus-master	$160
Optional Flash BIOS for AIR-SH	$35
486 AIR-UL ISA VLB 256K - 3 VLB slots, upto 50MHz Upto 64MB, ZIF, P24T support, bus-master	$160
Memory Expansion Card 32MB for AIR-UL	$90
486 AIR-MIS ISA VLB - Bus-master, w/ VLB IDE, FD, 2S/1P & VLB SCSI-2 w/ Adaptec 6360 chpset, Upto 64MB by 72Pin SIMM, ZIF, P24T support 256K	$325
Optional Flash BIOS for AIR-MIS	$35
486 AIR-EI Full EISA VLB - 3 VLB Slots, upto 50MHz, Upto 256MB by 72Pin SIMM, ZIF, P24T support, 8 EISA slots w/ 3 VLB extension(256/512K)	$340/420
386/486 Diamond FastBus VLB 256K - uses 72Pin SIMM onbrd IDE I/O, 2 VLB slots, ZIF, Bus-master	$320
486 Micronics ISA VLB JX-30 256K, VLB IDE, I/O	$450
486 Micronics EISA VLB 256K	$640
486 ISA PCI 256K - 3 PCI, 4 ISA Slots, ZIF, P24T Support, Intel Saturn ChpSt, Upto 128MB by 72Pin SIMM, Bus-master, Dallas onboard Battery, Award BIOS, onboard PCI NCR SCSI-2, IDE, Floppy supprts 2.88MB, 2S/1P, Complete driver, 256K/512K	$340/420
Pentium P5 PCI 256K - 3 PCI, 5 ISA Slots, 60/66MHz P5 CPU Support, Intel Mercury ChpSt, Upto 192MB by 72Pin, Bus-master, Dallas Battery, Award BIOS	$520
CPU & Memory: (Please Call, Subject to Change Daily!)	
Pentium P5-60MHz/66MHz CPU	$Call
Intel 486-33SX/33DX/50DX2/50DX/66DX2	$Call
AMD 486-40DX/66DX2	$Call
8Kx8/32Kx8/128Kx8 Cache Memory	$2/$5/$32
1MB DRAM (44256-70ns DRAMx8pcs)	$40
1MB VRAM (44256-70ns VRAMx8pcs)	$60
1MB RAM (256K-70ns SIMMx4pcs)	$Call
4MB RAM (1M-70ns SIMMx4pcs)	$Call
16MB RAM (4M-70ns SIMMx4pcs)	$Call
72Pin 70ns SIMM (4/8/16/32MB)	$175/350/680/1350
[illegible]	
Single/Dual Printer Card	$10/15
AT I/O 2S/1P/1G	$12
AT I/O 2S/1P/1G w/ 2 HiSpd UART 16550's	$45
4 Serial Port Card with Cable	$65
16Bit IDE 2FD/2HD Controller	$12
16Bit IDE 2FD/2HD with 2S/1P/1G	$14
16Bit IDE 4FD/2HD 2.88MB support	$29
16Bit IDE 4FD/2HD 2S/1P 2.88MB support	$49
IDE Caching Controller Upto 64MB, 2HD/4FD	$65
Promise DC-2000 VLB IDE w/ I/O	$35
VLB IDE 2FD/4HD with I/O Support 2.88MB, with 2 HiSpd UART 16550's, 1 Parallel	$75
Promise DC-4030VL-2 VLB IDE w/ 0MB Cache	$130
UltraStor 34F SCSI-2 VLB Bus-Mastering	$265
UltraStor Software Driver Kit for 34F	$45
BusLogic BT445S VLB SCSI-2, Bus-Mastering w/ Floppy Ctrl & Driver Kit	$265
Adaptec 1522A SCSI FD Controller (Bare)	$80
Adaptec 1522 SCSI FD Controller w/ Kit	$140

Adaptec 1542 Bus-master SCSI FD (Bare)	$185
Adaptec 1542CF Bus-master SCSI FD w/ Kit	$240
Adaptec 2742T EISA RISC-based SCSI-2 Controller w/ Dual Channel supporting 14 HDs, 2.88M	$385
Adaptec 2842VL VLB-to-Fast SCSI-2 Controller w/ 2.88MB Support & Driver Kit	$305
AIR QAccess Fast SCSI-2 VLB Controller w/ Adaptec 6360 Chipset and EZ-SCSI Software w/ VLB IDE/FD and 2S/1P/1G	$135
External SCSI-2 Adapter for QAccess/MIS	$40
NCR PCI SCSI-2 Controller	$105
Ethernet NE2000 Adapter Coaxial	$48
Video Card:	
Monochrome Graphic Printer Card	$12
16Bit 512K/1MB Trident SVGA 1024x768	$45/67
16Bit 1MB Tseng-4000 72Hz 32K Color	$75
Tseng-ET4000 VLB 1MB 16.7M Color	$100
Tseng-ET4000-W32 VLB 16.7M Color 1MB/2MB	$125/185
Cirrus Logic VLB 1MB/2MB	$95/135
SPiDER Cirrus Logic VLB 1MB/2MB	$95/135
SPiDER Cirrus Logic VLB Plus 1MB/2MB	$120/160
SPiDER 64 VLB/PCI	$Call
SPiDER Black Widow VLB 1MB/2MB	$205/265
SPiDER Black Widow Plus/PCI	$Call
Orchid Fahrenheit 1280 PLUS VLB 1MB/2MB	$165/205
Orchid Fahrenheit VA VLB 1MB/2MB	$175/215
Orchid Celsius VLB 1MB/2MB	$215/275
Diamond Speedstar Pro VLB 1MB	$110
Diamond Stealth 24 VLB 1MB DRAM S3-805	$155
Diamond Stealth Pro VLB 1/2MB VRAM S3-928	$255/315
Diamond Viper VLB 2MB VRAM 44M Winmarks	$365
Diamond Viper PCI 2MB VRAM 85M Winmarks	$420
ATI Ultra Pro VLB 2MB VRAM	$365
ATI Ultra Pro PCI 2MB VRAM	$410
Monitor:	
14" Monochrome Monitor	$90
Impression 14" 1024x768x0.39DP	$205
Impression 14" 1024x768x0.28DP	$245
Impression 14" 1024x768NIx0.28DP	$265
KFC 14" 1024x768x0.28DP	$245
KFC 14" 1024x768NIx0.28DP	$265
KFC 14" Multisync, 1024x768NIx0.28DP Digital-Control,Non-Glared	$345
KFC 15" Multisync,1280x1024NIx0.28DP Digital-Control,Non-Glared,Flat-Screen	$410
KFC 17" Multisync,1280x1024NIx0.26DP Digital-Control,Non-Glared,Flat-Screen	$770
MAG 15F Low-Rad 15" 0.28DP, 1280x1024NI	$475
MAG 17F Low-Rad 17" 0.26DP, 1280x1024NI	$885
Viewsonic 6E 14" 0.28DP 1024x768NI	$300
Viewsonic 15 15" 0.28DP 1280x1024NI Digi.Cntl.	$465
Viewsonic 17 17" 0.28DP 1280x1024NI Digi.Cntl.	$1020
Viewsonic 20 20" 0.28DP 1600x1280NI Digi.Cntl.	$1635
Viewsonic 21 21" 0.26DP 1600x1280NI Digi.Cntl.	$1890
Nanao F340iW 15" 0.28DP 1024x768NI	$540
Nanao F550iW 17" 0.28DP 1280x1024NI	$1150
Nanao F560iW 17" 0.26DP 1280x1024NI	$1450
NEC 3FGe 15" 0.28DP 1024x768NI	$580
NEC 4FGe 15" 0.28DP 1024x768NI 76Hz	$685
NEC 5FGe 17" 0.28DP 1024x768NI	$1080

Add and subtract to make your dream machine!

NEC 5FGP 17" 0.28DP 1280x1024 OptiClear	$1450
NEC 6FGP 21" 0.28DP 1280x1024NI OptiClear	$2380
Sony 1430 14" 1024x768 0.25DP	$570
Sony 17SE1 17" 1600x1200 0.25DP	$1230
Sony 1730 17" 1024x768 0.25DP	$990
Modem:	
Zoltrix Sendfax 96/24 Int. 9600 Fax/2400 Data	$27
Zoltrix Standard Int. 96/24 9600 S/R Fax/2400 Data + Bitfax for Windows + MNP5 Software	$48
Zoltrix 14.4K S/R Fax/Data V.32Bis, V.32, V.42Bis, V.42, MNP5 +Bitcom + Bitfax Internal/External	$125/150
US Robotics Sportster 14.4K Data/Fax V32.bis, V.32, V.42 Internal/External	$150/185
Intel Fax Modem 14.4K Internal/External	$169/179
Floppy Drive/Tape Backup:	
Teac 1.2M 5.25"/1.44M 3.5"/2.88M 3.5"	$46/38/90
Teac Dual 1.44M & 1.2M	$115
Toshiba 2.88M 3.5"	$68
Conner 250MB TapeBackup Int. w/ DC2120	$155
Colorado 250MB TapeBackup Internal	$155
3M Tape Cartridge DC2120 for 250MB QIC-80	$16
[illegible]	
101 Enhanced Keyboard	$17
KeyTronic 101 Enhanced U.S. Made	$30
Focus 2001 101 Enhanced Click w/Cover	$36
Focus 8000 111 with Calculator	$40
Focus 9000 129 Programmable w/Calculator	$60
NorthGate OmniKey 101/102	$75
MS Compatible 3-Button Mouse	$8
Logitech Serial First Mouse/Mouseman	$30/45
Logitech Ergonomic Bus Mouseman	$65
Logitech Trackman	$75
Logitech Mouseman Cordless	$85
MicroSoft Ergonomic Serial Mouse V2.0	$50
Logitech Scanman Color 400DPI	$415
MS DOS 6.2/Windows V3.1 (Registerable)	$40/50
Standard Mini Tower with 200W PS	$55
Premium w/PS Mini/Dsktp/Med/Full Tower	$70/75/95/115
Green Hi-Efficiency PS PS-II Type 200W UL	$55
Power Supply PS-II Type 230W UL / 300W UL	$42/85
486/P5 Pentium CPU Cooling Fan	$10/40
Chassis Second Cooling Fan 3" or 3.5"	$20
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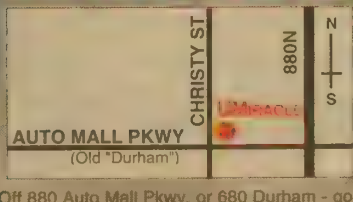

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An OS/2 Reality Check: Part 2

Or, You Can't Get There From Here

BY FABIAN PASCAL

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Fabian Pascal is a San Francisco independent consultant, teacher, and writer specializing in relational database management, OS/2, and office and portable computing. An industry analyst, he teaches seminars, consults, and has published extensively. He is author of SQL And Relational Basics *(M&T Books, 1990) and* Understanding Relational Databases *(John Wiley, 1993).*

Holidays do not resolve problems left behind; they must be faced again upon return.

In my last article I described three non-ideal options for preparing a PC presentation using Freelance for OS/2:

(a) Import 300dpi TIFF files and, if they're not legible, have Freelance print out transparencies for at least those slides containing imported TIFFs; this would split the presentation into two components: the PC slide-show and some transparencies.

(b) Find a way to convert the TIFF files to PM metafile format, and import them into Freelance; an additional step, but this would eliminate the need for transparencies—the purpose of the whole exercise in the first place.

(c) Scan the book figures into TIFF or metafile format; a waste, but the last resort if nothing else worked.

At the time I was relying on the publisher of my book to provide the necessary TIFF images. I asked them for a few samples at various resolutions, to find the best resolution/file size tradeoff. But, as I already explained, even at the low 300dpi resolution the TIFF files brought my 12MB RAM system to its knees.

I could, of course, add memory (always beneficial under OS/2); this is not a complete solution because, with swappers in the 50MB+ range, one would need lots of memory to avoid swapping altogether.

On the other hand, if I went the transparency route, the performance problems would be only temporary, until I printed the transparencies out. The presentation would contain only slides without imported images, and thus performance would not suffer. The only drawback would be the inconvenience of transparencies, the point of a Freelance presentation is to get rid of them.

I did upgrade my memory from 12MB to 28MB. But then my publisher, annoyed at the amount of testing necessary to figure out the optimal resolution, opted out. So now I was left only with option (c), possibly followed by (b). I could either do the scanning myself, or I could rely on a service bureau. In either case, the output question remained: should it be .TIF files (the transparency option), or PM .MET files (hopefully no transparencies)?

SCANNING FOR SCANNER SUPPORT

My business involves a considerable number of presentations. In most cases I use clips from the trade press as examples. I must type the text from each into the presentation, which is inefficient, and certainly not as convincing as images of the actual clips. Using a service bureau would be too expensive for this purpose, so doing my own scanning would be more cost-effective.

As it turns out, however, no scanner manufacturer provides an OS/2 driver for its product line. In fact, IBM's own color scanner comes only with a Windows driver!

Recently, Hewlett-Packard shipped the ScanJet IICX color scanner, and judging by its specifications it seemed appropriate for my needs. But the scanner comes with its own proprietary SCSI card, which

- does not have an OS/2 driver (HP does not, at this point, intend to provide one, and neither does IBM)
- it does not support SCSI devices other than the IICX
- is an ISA adapter

This means that attaching the IICX would take an additional slot in my EISA system; performance would not be the best possible; and I would still need to scan in a Windows session as, indeed, the IICX comes with DeskScan II, a Windows-based scanning program. This would hardly be an OS/2 solution, and represents a heavy price to pay. Besides, I have not installed WIN-OS2 on my system, and see no reason to do so now, certainly not just for scanning purposes.

What I really wanted was an OS/2 solution, one that would also take advantage of my DPT EISA SCSI caching adapter. And there was a ray of hope: Danmar Systems produced an OS/2 driver for the ScanJet family for exactly this purpose. They did such a good job of explaining it, that I will simply restate their explanation here:

"OS/2 uses a layered device driver approach to supporting peripherals. The lowest and the hardware-dependent layer is the Adapter Device Driver layer (.ADD). These are the drivers provided by the manufacturers of the particular adapter cards. They are designed to let OS/2 access any device attached to these cards. IBM developed a certain protocol to communicate with these device drivers. They do very specific and very non-complex functions, like read a block, write a block, inquire about the devices, etc.

As it turns out, no scanner manufacturer provides an OS/2 driver for its product line. In fact, IBM's own color scanner comes only with a Windows driver!

"The next layer is composed of device managers. These are the ones that end with the .DMD extension, for Device Manager

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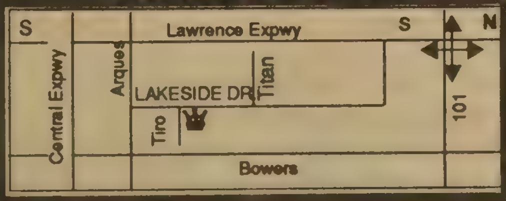

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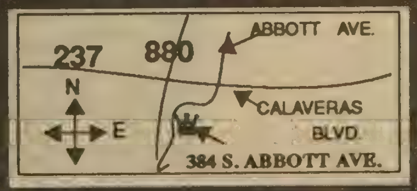

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"The next layer up is called the class drivers. These are the drivers that usually end with the extension .SYS, that applications communicate with. An application cannot communicate directly with a .DMD or an .ADD driver, which require physical addresses that the applications cannot access.

"With this in mind, our SCSISCAN driver is basically a class device driver that allows applications to communicate with any HP SCSI scanner (IIP, IIC, and IICX) through the OS2ASPI.DMD, which in turn communicates with the appropriate .ADD driver for the controller that is connected to the scanner. This is why you must have an .ADD driver for your SCSI controller for SCSISCAN to work."

Well, of course my DPT adapter has the .ADD driver; otherwise I could not have used it under OS/2. So SCSISCAN seemed just the thing I needed, except that I still did not have OS/2 scanning software, particularly one with the ability to output PM metafiles.

METAFILES ANYBODY?

To recall, Freelance imports either greyscale TIFF files (which are bitmaps), or PM metafiles (rasterized). Because of the program's limited display resolution of TIFF files (max. 75dpi), Lotus suggested importing .MET files instead, for the following reasons:

"The metafile stores a series of drawing commands, for example to draw a rectangle with particular dimensions, but does not store any information about resolution.

"A metafile, when imported into a program, is almost like a recording of the image that the target program just plays back. It is scalable, since the dimensions can simply be readjusted, unlike a bitmap image like a TIFF file where a lot more "intelligence" would have to go into figuring out which dots could/should be moved.

"So, your conversion program would take the bitmap file and convert it to a PM metafile but the resolution would not be preserved. It would try to figure out how to break down the scanned image into units it knows about: rectangles, lines, circles, polygons, etc. The only place resolution would enter into the picture is that with a higher resolution, it would be more apparent to the conversion program whether an object/line/etc. is contiguous or not.

"Metafiles are fairly efficient and you won't see the huge size and performance issues that you are currently experiencing. Since OS/2 printing is built around PM Metafiles, you should also actually see very quick printout."

Great, but guess what? There is no scanning software that generates PM metafiles. In fact, there is no OS/2 scanning software, period. The only thing I came up with is a "quick-and-dirty" utility from Imara Research Corporation. Scantool allows scanning, viewing, editing, and filing document pages under OS/2. However, it does not support color, and outputs only bitmap files (.PCX, raw TIFF, and Group 3 TIFF). So, even with a IICX scanner, the SCSISCAN driver, and the Scantool utility, I would still need to convert .PCX or .TIF files to PM metafiles.

I then realized that PRNTSCRN, an OS/2 screen capturing utility from Mitnor Software, can display .PCX files, and capture them to PM metafiles. Thus, I thought, I could scan the book figures with Scantool into .PCX files, read them into PRNTSCRN, and capture them to PM metafiles to import into Freelance. A rather roundabout way to go about it, but an OS/2 solution nevertheless.

CAVEAT EMPTOR

But there is, of course, a rub: Lotus's comments apply only to metafiles generated from scratch, in which case a pure rasterized file is generated, which is indeed device independent, and will display at the highest resolution available on the system. But this is not so for metafiles converted from bitmap files, for several reasons:

- The converting software must rely on the initial bitmap resolution to build

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ARCserve v5.01 50/100/250 users	1,082/1,181/1,536
ARCserve v5.01 500/1000	2,982/5,934
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Network Archivist NLM	1,224
Expansion Module (Doubles Capacity)	576
LEGATO NetWorker (Single Server)	555
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Power Tape Ext-25 2 GB SCSI Tape Drive w/Ctrl.	1,251
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Power Tape Ext 50-4 GB SCSI Tape Drive w/Ctrl.	1,870
CONNER Backup Exec NetWare 3.X/4.X NLM	658
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EXABYTE FS1G Int. 1.5GB w/Ctrl	775
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SCSI Express w/ 3 CDROM w/o CTRL	2,606
SCSI Express w/ 2x2 CDROM w/o CTRL	3,276

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WINDOWS Platform	359
MacIntosh Platform	359
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Remote	210
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PC Mail 5/20/100 Users	273/930/3,633
MHS Gateway/PROFS	708/3,405
SMTP/X400 Gateway	3,405/3,405
FAX Gateway	1,419

Network Utilities

BRIGHTWORKS Utilities for NetWare	359
CHEYENNE Monitrix Network Mgmt.	583
Inoculan (20/250 workstations)	326/655
Utils for NetWare 286/386	257
DIRECT ACCESS Network Menu	366
FUNK App Meter	464
FRYE NetWare Management	339
Early Warning System	339
Lan Directory	339
INTEL LanDesk Manager v 1.5	1,070
SYMANTEC Norton Admin. 5/10 Users	247/438
Norton Admin. 25/50/100 Users	1,068/2,028/3,680
SABER Lan Workstation 1st node/add 1	129/39
MICROTEST Lan Assist	265
Map Assist	360
NOVELL Lanalyzer for Windows v2.0	1,055
Central Point Anti-Virus for NetWare	889
Xtree Tools for Networks	565
Xtree Tools Server Extension	442

Peer-to-Peer Networking

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AE-2 Adapter 16-bit Ethernet Adapter	217
Noderunner Starter Kit 5.0 for DOS	477
Noderunner Starter Kit for Windows	550
Noderunner/C Coax 16-Bit Adapter	188
Noderunner/A Combo 16-Bit Adapter	238
Lantastic 5.0 for NetWare/MAC	368/589
Lantastic A/I for Win/6 /12 users	139/574/1,053
Lantastic 5.0 for TCP/IP	220
Etherbasket AE-2 Adapters (12 pack)	2,172
Etherbasket AE-3 Adapters (12 pack)	2,429
NOVELL DOS 7.0 (Includes Personal NetWare)	CALL
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NOVELL Personal NetWare (NetWare Lite)	89
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MICROSOFT Windows for Workgroup V3.11	159
WFW V3.11 Add-On for Windows 3.1	69
WFW Starter Kit (Software/Hardware for 2)	399
Windows NT Single User	341
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OS/2:

the drawing instructions; if that is low, then the result will be poor too; increasing the initial bitmap resolution to one that would enable good metafiles creates huge files (60MB at 1200dpi) which, at best, take hours to convert (in fact, the high resolution would not survive the conversion, because 1200dpi images are larger than the screen, and fitting them on the screen to capture them with PRNTSCRN lowers their resolution back to unacceptable levels).

- In fact, the converted metafiles are not fully rasterized; they still contain bitmap components in them, which remain resolution-specific. The end result is that metafiles generated by this process do not display better, but actually worse than the TIFF originals in Freelance.

Not only do metafiles fail to resolve the display problems, but I could not even print them out on transparencies. Neither OS/2 (Picture Viewer) nor OS/2 applications (Freelance, PRNTSCRN) would print the metafiles generated by the above process. Lotus did not know why, but PRNTSCRN's Mitnor informed me that after some testing they managed to print them by checking the "Printer Specific" option in the "Queue Options" page of the OS/2 printer object notebook. But even then a bug in the OS/2 HP LaserJet III driver turns all grey shades into black, which makes the output unusable. Worse: Freelance printed mirror images of the metafiles and, as of this writing, Lotus has not replied to my query on this matter.

CONCLUSIONS

As this and the last article demonstrate, finding OS/2 solutions to even very basic needs is, to put it politely, not easy and indeed, in some cases, one may not be available at all. OS/2 software and OS/2 solutions are not the same, and it frequently appears that vendors do not yet understand what the latter mean.

In this particular case, developing a full Freelance PC slide-show is not possible (as an aside: without super VGA support, most notebooks are currently unable to even run such a presentation). There is no way to totally avoid transparencies, which defeats the very concept behind Freelance.

And even then there are problems. If you already have a scanner other than a ScanJet, your only option is to work under Windows or WIN-OS2. You could get a ScanJet IICX, SCSISCAN and Scantool, and scan images yourself into .PCX or .TIF files under OS/2, but if you have a LaserJet III printer you will lose any shading. You could rely on a service bureau to generate transparencies for you, but you would still lack consistency with the Freelance slide layout.

There is no question that OS/2 is a truly superior operating system.

There is no question that OS/2 is a truly superior operating system. But by allowing it to run both DOS and Windows applications, IBM has diminished considerably the incentives for application developers and hardware manufacturers to support OS/2 in native mode, a nontrivial, more expensive endeavor. Neither has IBM proven very responsive to many of the small vendors who did express interest in supporting OS/2, but who required various degrees of help.

What is more troubling is that this situation does not show signs of improvement. Not many vendors are working on, or planning OS/2 support and, in fact, some are actually putting existing OS/2 projects on hold. Without support for a wide range of hardware, particularly new, emerging technologies, and a reasonable choice of native applications that fully exploit OS/2's features, OS/2 seems to be turning into a sheer multitasker of DOS and Windows applications, and that is a waste.

(I would like to thank Dan De Soto of Danmar Systems, Tim Shrieve of Mitnor Software, the technical support staff at Distributed Processing Technology, and John O'Keefe, formerly of Lotus, for their help with problems discussed in this article). ■

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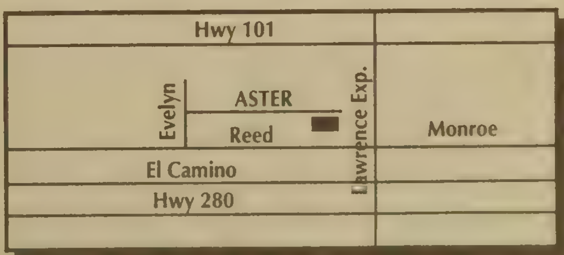

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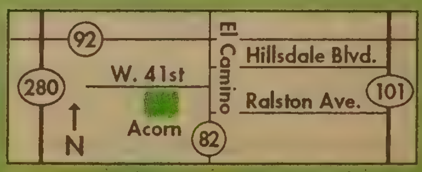

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Faxing On The Internet

BY KEVIN M. SAVETZ

Internet users are tinkerers by nature. The 'net wouldn't be possible without thousands of ingenious hackers around the world, tinkering away to blend a copious hodgepodge of computers, people, and appliances. These great minds have brought us such fine artistry as the Internet Toaster, a variety of 'net-linked vending machines, even dial-a-Bible-verse. Many of these tools are useless and many are fun, and occasionally someone tries doing something useful.

In the "something useful" category, a creative group of people has plugged its fax machines into the Internet for "an experiment in remote printing." The experiment is a good hack, allowing Internet users to send faxes via electronic mail. It works simply enough—send electronic mail to a special address, and soon after (if your recipient's fax machine is in an area covered by the service) out comes a freshly minted fax. This service is free—it doesn't cost the sender a penny to send a fax. The recipient is only out the cost of a sheet or two of fax paper.

The experiment is the brainchild of Carl Malamud (the creator of Internet Talk Radio) and Arlington Hewes. They're doing research on how to integrate special-purpose devices (like facsimile printers) into the fabric of the Internet. The service is currently free, but the creators are investigating ways to help the organizations recoup the cost for sending faxes.

HOW DOES IT WORK?

A variety of companies, institutions, and citizens linked to the Internet have joined the experiment by linking a computer and fax modem to the 'net. When an organization joins the remote-fax service, they specify what areas they are willing to send faxes to. In most cases, an organization will allow faxes to be sent to any machine that is a local call from their fax server.

When you send an email fax message, you (naturally) must include the phone number of the recipient's fax machine. A computer looks at the phone number and decides if any participating fax machines cover the area you want to fax to. If so, your message is routed to the appropriate machine. Otherwise, you will receive electronic mail with the disappointing news that your fax couldn't be delivered.

WHO'S FAXABLE?

Can you send a fax anywhere? Well, no. The experiment only began in July, so only a smattering of participants have enlisted their fax machines in the quest to send outgoing messages from total strangers to other total strangers. As of early November, you can send faxes to all of Australia; Washington, DC; big chunks of Central California; some of Southern California; and parts of Michigan, Massachusetts, and New York. (See sidebar for complete coverage information.)

More locales will be faxable soon, including more parts of the United States, Denmark, Finland, Ireland, Japan, and Sweden.

SENDING A FAX

To send a fax over the Internet, compose an email message. The body of the message should contain the contents of your fax message. The TO: line is the most important part of your email, because it must contain the phone number of the recipient's fax machine as well as the recipient's name.

The TO: line should look something like this:

TO: remote printer.Arlington_Hewes/Room_403@0.1.5.2.8.9.6.5.1.4.1.tpc.int

To the left of the @ symbol, you must include the identity of the recipient. The words "remote-printer" tell the fax server the type of access. (In this case, faxing or remote printing.) Because some mailers have difficulty dealing with addresses that contain spaces, you should be very careful as to what characters you use to identify the recipient. It's safest to use upper and lower case letters, digits, the _ and the / character. When the fax cover sheet is generated, the _ will turn into a space and the / will become a line break. So, the above address would generate a cover sheet like:

Please deliver this facsimile to:
Arlington Hewes Room 403

The mess of numbers to the right of the above example identifies the telephone number of the remote fax machine. Exchanges must be specified by country code and phone number. This means you must specify the country code, then the phone number of your victim. If you're sending to a machine in the US, this just means you need to send a 1, the area code, and the phone number. Now, reverse the string of numbers (that's right, reverse them. Don't ask me why this step is necessary. What are computers for, after all?), put periods between them, and add the Internet domain ".tpc.int". Whew!

So, to send a fax to Mr. Hewes, at 1-415-698-2510, your email would be **TO: remote-printer.Arlington_Hewes/Room_403@0.1.5.2.8.9.6.5.1.4.1.tpc.int**

You can send a fax to multiple fax machines, or even a combination of faxes and traditional email recipients. After the deed is done, you will receive electronic mail telling you if your fax was successfully sent or not.

FOR MORE INFORMATION

For a copy of the Frequently Asked Questions list on faxing from the 'net, send mail to "tpc-faq@town.hall.org" and you will automatically receive the FAQ via email. The FAQ also covers advanced topics like using MIME to send fancy formatted text or graphics, and how to operate a fax server.

Fax sites are being added to the network on a regular basis—for a current list of faxable areas, send email to "tpc-coverage@town.hall.org". There is also a mailing list for discussion of the fax service and its implementation. To join, send a request to "tpc-rp-request@aarnet.edu.au".

If you have a question for an administrator that isn't covered on the FAQ or general mailing list, send email to Arlington Hewes at "tpc-admin@town.hall.org". ■

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Kevin M. Savetz is a computer journalist based in Arcata, California. He edits the "Internet Services Frequently Asked Questions and Answers" list. He can be reached via email at "savetz@rahul.net".

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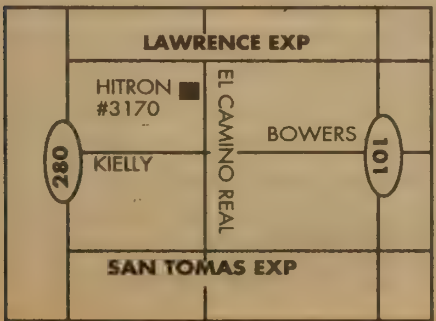

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Programming With Your Macintosh

ProGraph Is A Powerful Object-Oriented Programming Language That Gives Users Great Latitude While Preserving Ease-Of-Use

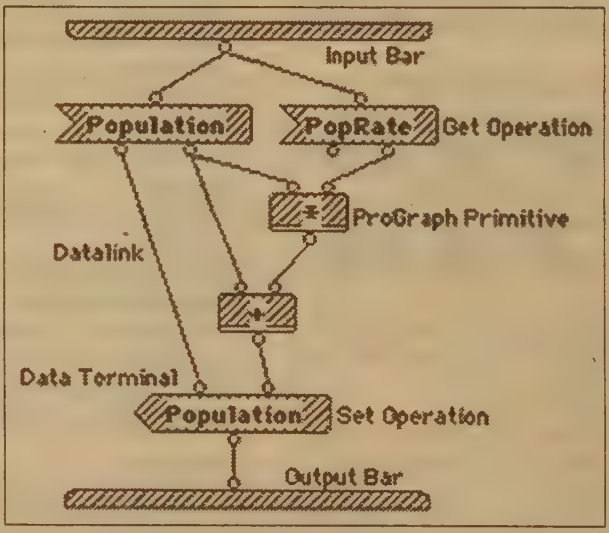
BY MICHAEL NIEMANN

RESOURCES:

ProGraph 2.5, $495
TGS Systems, Inc.
2745 Dutch Village
Rd., Ste. 200
Halifax, Nova Scotia
B3L4G7, Canada
(902)455-4446
Fax (902)455-2246

When I received the advertisement for ProGraph 2.5 in the mail, I was somewhat skeptical. After all, it featured a person who claimed to have switched from HyperCard to ProGraph with few problems and amazing increases in productivity. Let me explain my skepticism first. I moved over to the Mac platform about three years ago. Before that I was a DOS person with programming experience in BASIC, FORTRAN, Assembler, and PROLOG; not a hacker, but I could get pretty nice stuff going. In the Mac environment, I immediately worked with HyperCard but was daunted by the seeming complexity of the Mac interface and the requirements it poses for the programmer.

ProGraph delivers everything it promises.... This was the first time I did not write lines of code to create a program.



Given that, my skepticism was understandable. So, after receiving the package, I installed ProGraph and set myself a goal. I was going to learn this package by writing an actual program. The task was relatively straightforward, take an international relations simulation which required a lot of calculations on paper and create a program which would take over these calculations. I hasten to say that ProGraph performed exceptionally well, even if my time frame was a bit optimistic.

ProGraph is a visual, object-oriented programming language for the Macintosh (and other platforms, but more about that later) which is used to create standalone applications able to run on any Mac with an 020 processor or higher. It was the first part of the description which fascinated me. Having written numerous lines of code, the idea of using a visual language held promise. ProGraph delivers everything it promises. All programming procedures adhere to the visual character of the language, and all elements of the language take the form of icons on the screen. This was the first time I did not write lines of code to create a program.

The language consists of classes with data objects, methods, operations, persistents. These categories already indicate that ProGraph is not your usual language. As a single-inheritance object-oriented language, ProGraph basically provides the user with the necessary means to create classes of objects with attributes and manipulate these objects by sending messages to them. For my simulation, I created a class, "States," which had a large number of attributes, i.e., Population, GDP, etc. Each of the states in the simulation were one object in the class.

To manipulate these objects, the programmer manipulates them using methods. Class dependent methods are either plain, get, set, or initialization methods. Plain methods perform any type of operation, get and set methods get or set the value of an object in that class. The initialization method sets attributes of objects at start up, for example. Methods consist of one or more cases which describe the data flow of an operation.

Operations are the basic components of the cases. Since ProGraph is a visual language, it is impossible to convey a sense of it without an image. The graph to the left demonstrates some of the features of ProGraph. On the top is the input bar. Anytime the user creates a new method, a new window appears which features an input bar and an output bar. Each bar contains at least one terminal (the little round dot). The user then inserts operations that use the input data, manipulate it, and send it to the output bar. All operations are icons which the user selects from a menu. In the graph, the input information consists of one instance of the class "States." Two get operations get the values for population and the population growth rate from this particular state. First, the population is

continued on page156

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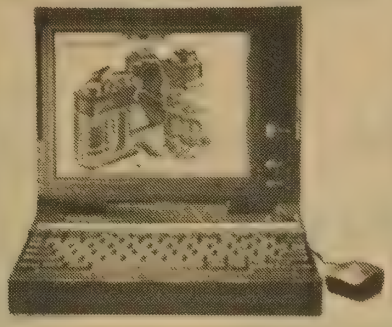

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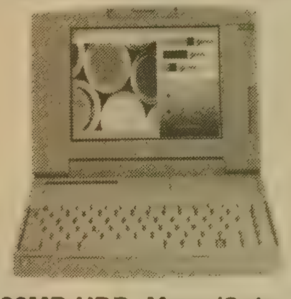

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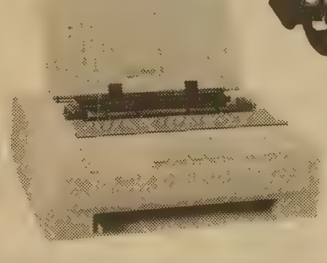

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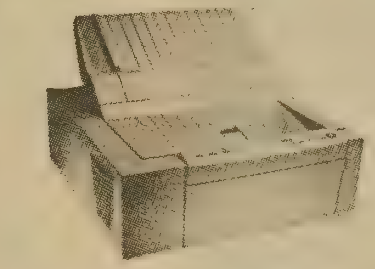

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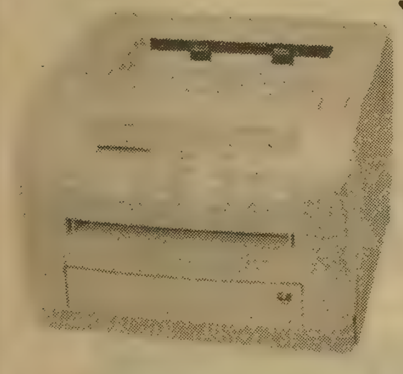

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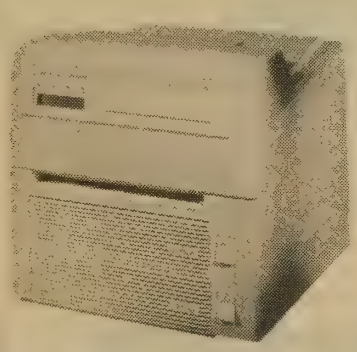

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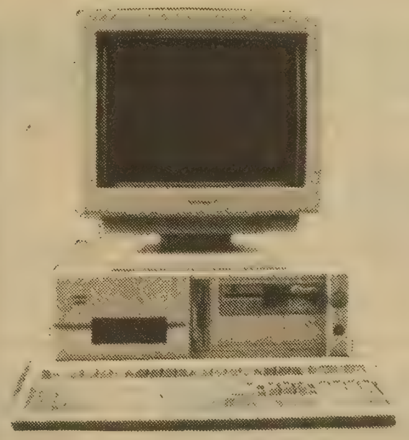

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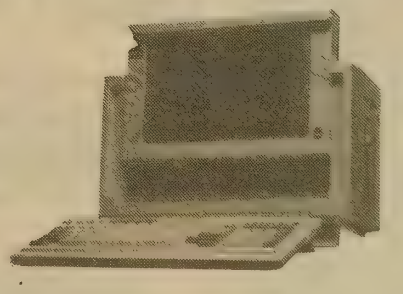

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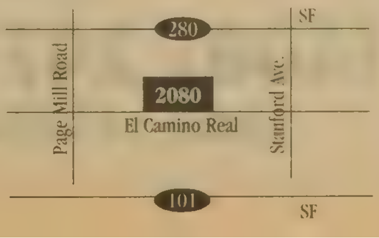

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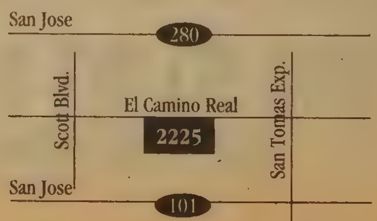

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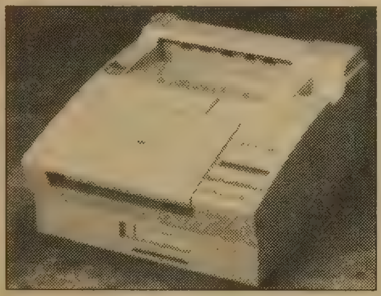

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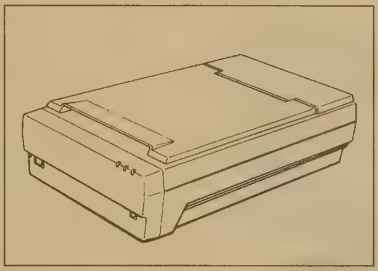

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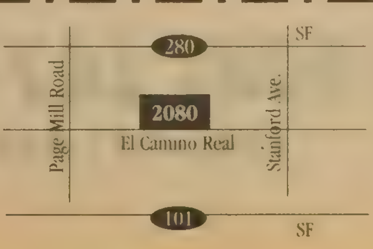

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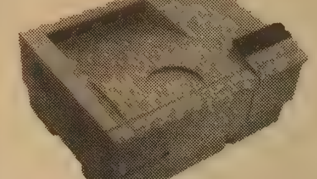

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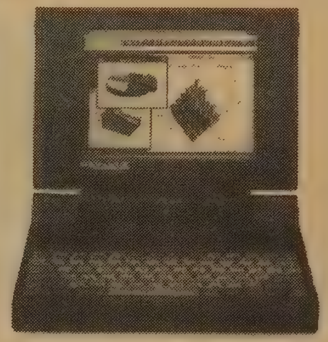

Versa E Notebooks

486DX2-50 MHz

- ◊ i486 SL DX2-50 MHz
- ◊ 4MB RAM Expandable to 20MB
- ◊ Removeable/Reversible Screen
- ◊ 340 MB Hard Drive
- ◊ 2 Type II PCMCIA Slots
- ◊ MS-DOS & Windows
- ◊ Front-Mounted Mouse

$4999

MultiSync Monitors 3V

- ◊ 15", .28mm flat square CRT
- ◊ 1024x768 at up to 60Hz
- ◊ Energy Star compliance
- ◊ 3 year warranty

$529

Professional Series	
5FGp 17" 1024 .28	1399.00
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SVGA 14" 1024 .28	329.00
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4FGe 15" 1024 .28 76Hz	698.00
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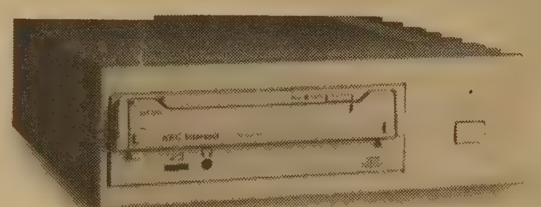

Triple Speed

MultiSpin CD ROM Drive

- ◊ 145ms access time
- ◊ 256Kb Cache
- ◊ 450Kb/sec transfer rate
- ◊ 2 year limited warranty

3Xi	Internal	$479
3Xe	External	$569

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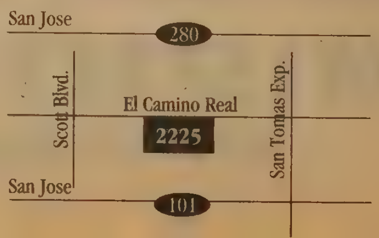

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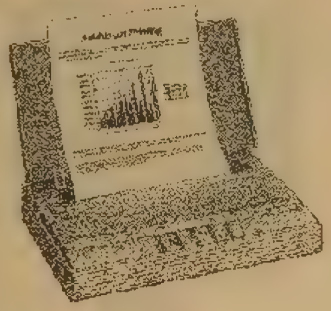


BJ-10sx Portable
Bubble Jet Printer

- ◊ Prints 30% faster than 10ex
- ◊ Weighs 10% lighter than 10ex
- ◊ Text graphics up to 360dpi
- ◊ Uses plain paper and transparencies
- ◊ 1 year warranty

Optional 50-sheet (ASF6420) Cut sheet Feeder $89

$249

innova 486NXM 25
Color Notebook

- ◊ 4MB RAM
- ◊ 120MB HD
- ◊ Active Matrix Color
- ◊ 2 PCMCIA slots
- ◊ DOS & Windows preinstalled
- ◊ Built-in trackball
- ◊ One year limited warranty

Color!

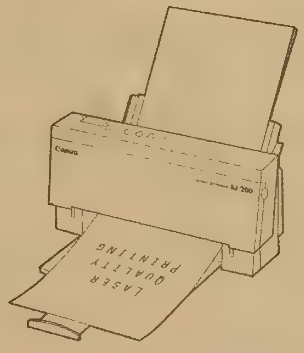
$3599

BJC-600 Color
Ink Jet Printer

- ◊ 360 dpi
- ◊ 240cps draft, 170cps high quality
- ◊ 64 nozzles per color
- ◊ 16.7 million colors available
- ◊ 100-sheet ASF
- ◊ 2 year product warranty

Color!

$599



BJ-200
Ink Jet Printer

- ◊ Prints up to 248cps
- ◊ 100-page sheet feeder
- ◊ 7 resident fonts
- ◊ Hold up to 10 envelopes

$279

Wide Carriage $399

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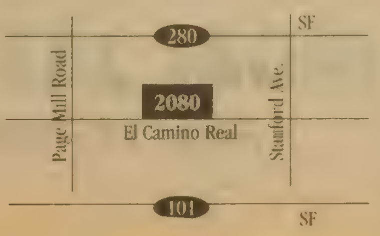

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CREATIVE LABS, INC.

EDUTAINMENT CD™ 16
Upgrade Kit

- ◊ Sound Blaster 16 Sound Card
- ◊ Internal CD-ROM drive
- ◊ Stereo Speakers
- ◊ Software:
  - Toolworks Multimedia Encyclopedia
  - The Animals
  - Secret Weapons of the Luftwaffe
  - Monkey Island
  - Loom
  - Where in the World is Carmen Sandiego

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Sound Blaster Deluxe	69.00
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Sound Blaster 16	169.99
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FUSION DOUBLE CD

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- ◊ NEC internal CD-ROM drive
- ◊ 350ms access time
- ◊ 4 Top CD Library Titles
- ◊ Pro Audio Spectrum 16 Sound Card
- ◊ And more...

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Pro Audio 16 Basic	89.99
Pro Audio Spectrum16	129.00
Pro Audio Studio 16	159.00

ORCHID

Sound Wave 32

- ◊ 16-Bit CD Quality Sound
- ◊ MPC Level II Compatible
- ◊ 20 MIPs 16-Bit Digital Signal Processor
- ◊ 1 MB of Wavetable Sample
- ◊ Speakers, Microphone, Software

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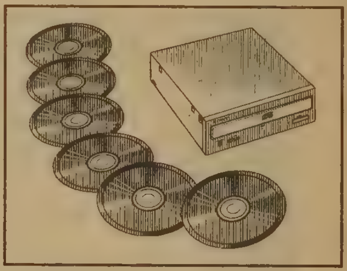
Game Wave 32

- ◊ 16-Bit CD Quality Sound
- ◊ MPC Level II Compatible
- ◊ 20 MIPs 16-Bit Digital Signal Processor
- ◊ Support Sound Blaster, AdLib General MIDI & MT-32 modes
- ◊ Playback Only

$148

SONY



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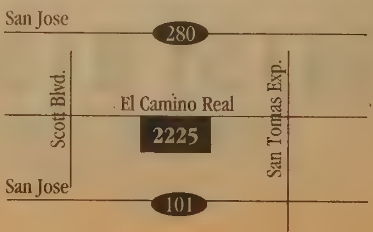

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200ms Access Time
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MITSUMI

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TEXEL

3021
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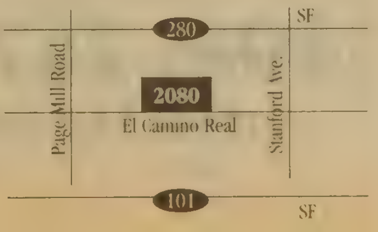

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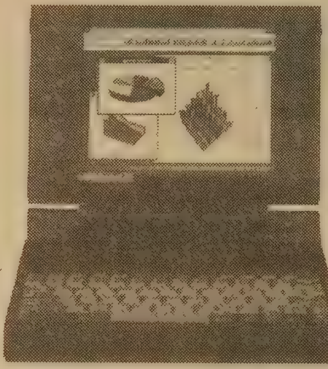
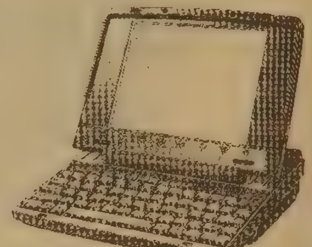


intel inside

NEC Versa

486SL-25MHz	
4/120 Color	$3299
4/180 Color	$3499
486SL-33MHz	
4/180 Mono	$2999
4/180 Color	$3899

Avanti 025



486SLC-25MHz
Color

- ◊ 486 SLC-25MHz
- ◊ 4MB RAM Exp to 20MB
- ◊ DOS, Windows
- ◊ Passive Matrix Color
- ◊ 120MB Hard Drive
- ◊ Built in Track Ball
- ◊ 96/24 Fax Modem

Color

$1999

TOSHIBA
T4400SX

- ◊ 486 SX-25 Mhz
- ◊ 120 MB HD
- ◊ DOS, Windows
- ◊ Backlit LCD VGA
- ◊ 4 MB RAM
- ◊ 1-year limited warranty

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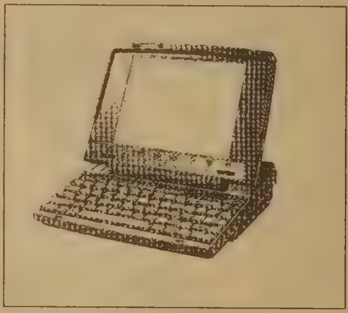
Ergonomical
Design in Teal
or Graphita
Color Case!!



ARCHE
486SLC-33MHz

- ◊ Affordable 486 Notebook
- ◊ 4MB Expandable to 8MB
- ◊ Removable 12MB HD
- ◊ Built-in Trackball
- ◊ DOS, Windows, Publish, Works & Carrying Case

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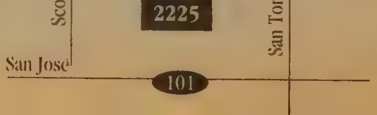

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External	169.00

14.4 Modem

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Fax Modem

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344MB	$255

Maxtor

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Complete Communicator EZ

• Modem • Voice • Fax •

- ◊ 9600bps Group II Send/Receive Fax
- ◊ Fax directly from WIndows or MS-DOS applications
- ◊ 2400bps Hayes compatible modem
- ◊ Full-featured Personal Voice Mail System
- ◊ Auto Voice/Fax Detection
- ◊ Internal Version
- ◊ 7 year warranty

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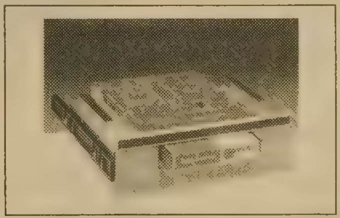
COLORADO
MEMORY SYSTEMS INC.



JUMBO Internal

DJ-10	120MB	99.00
DJ-20	250MB	159.00

Trakker External
Operates off Portable Port. Ideal for notebooks!

JT-10	120MB	288.00
JT-20	250MB	328.00

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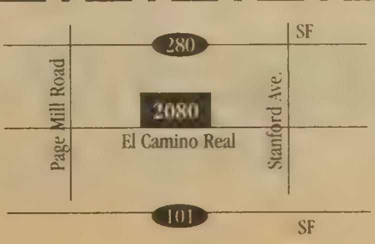

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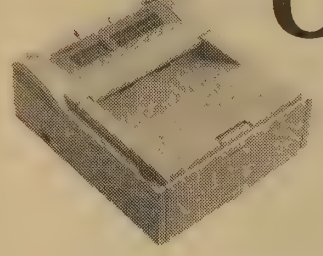
Complete Printer Source Center

OKIDATA



OL-400e LED Page Printer

- ◊ Compact Size and sleek design fits comfortably on any desktop
- ◊ Fast 4ppm printing with RISC microprocessor for higher productivity
- ◊ 44 fonts for great-looking correspondence and reports
- ◊ Perfectly compatible with virtually all software applications

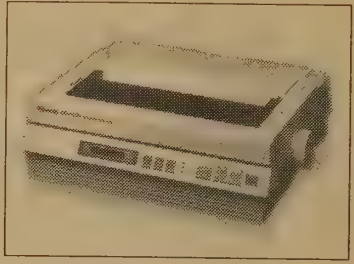
$479

OL410e

- ◊ 600 dpi resolution
- ◊ 4 ppm

$688

Panasonic Office Automation

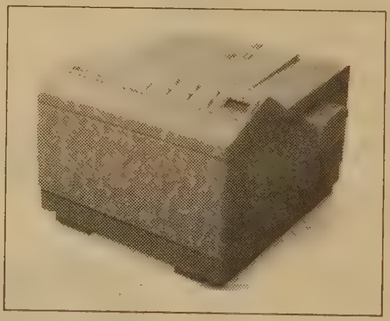


2nd Inventory Blow-Out

KX-P2123	
24-pin, 240cps, 7 fonts	$189.00
KX-P2624	
24-pin, 300cps, 11 fonts	$279.00
KX-P1150	
9-pin, 240cps, 7 fonts	$119.00
KX-P4410	
300dpi, 5ppm, Laser	$489.00
KX-P2180	
9-pin, 240cps, 6 fonts	$139.00
KX-P4450	
Laser	$799.00

* Above printers are refurbished w/original factory warranty

HEWLETT PACKARD

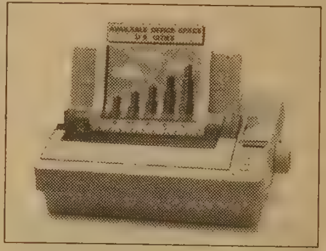


LaserJet		
4	8ppm, 600dpi, PCL-5	$1349.00
4M	6ppm, Postscript Mac/IBM	$1949.00
4ML		$999.00
4MP		$1395.00

DeskJet		
550C	Color Printer	$529.00
1200C	Color 6ppm, 2MB RAM	$1399.00
1200C/PS	Postscript	$1899.00

CITIZEN

200GX Printer

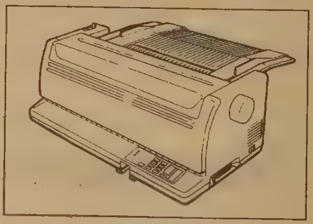


- ◊ 240cps, 9-pin printer
- ◊ 5 built-in fonts
- ◊ Fontlocking feature
- ◊ Paper parking
- ◊ 2 year limited warranty

$119

FUJITSU

Ideal for Business & Home Office



DL1200

- ◊ Small footprint design occupies less space
- ◊ 200cps for high-speed draft
- ◊ 136-column printer line
- ◊ 24-wire print head for crisp output
- ◊ Fujitsu, IBM and EPSON emulation

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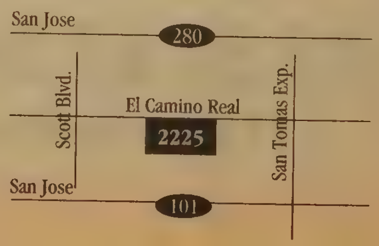

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Fits all 3.5" IDE Hard Drives

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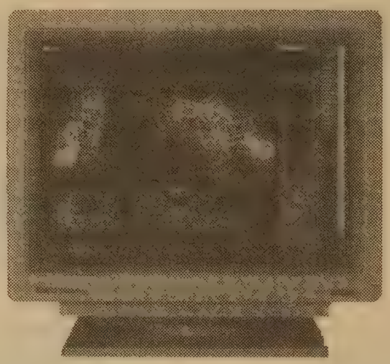

F550i

- ◊ 17" FST 0.28mm dot pitch
- ◊ 1280x1024 resolution
- ◊ Conforms to MPR-II
- ◊ VGA Cable included
- ◊ Wide View Full Sscanning Function
- ◊ Non-glare, anti-static
- ◊ Dynamic Focusing
- ◊ FCC Class B
- ◊ FlexScan (30-65 kHz)

$849*

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F340i-W

- ◊ 15" FST 0.28mm dot pitch
- ◊ Non-glare, anti-static
- ◊ 1024x768 resolution
- ◊ VGA Cable included
- ◊ PowerManager energy saving system
- ◊ Wide View Full Scanning Function

$559

F550i-W

- ◊ 17" FST 0.28mm dot pitch
- ◊ ErgoCoat™ Coating
- ◊ 1280x1024 resolution
- ◊ VGA Cable included
- ◊ Wide View Full Scanning Function
- ◊ PowerManager energy saving system

$1039*

F560i-W

- ◊ 17" FST 0.28mm dot pitch
- ◊ 1280x1024 resolution
- ◊ Wide View Full Scanning Function
- ◊ PowerManager energy saving system
- ◊ ErgoCoat™ Coating
- ◊ VGA Cable included

$1270*

* Price after MFG rebate

F760i-W

- ◊ 21" FST 0.28mm dot pitch
- ◊ Non-glare, anti-static
- ◊ 1024x768 resolution @76Hz
- ◊ Dynamic Focusing/Dynamic Beam Spot Control
- ◊ PowerManager energy saving system
- ◊ Wide View Full Scanning Function
- ◊ VGA Cable included

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F780i-W *Special Bundle!*

- ◊ 21" FST 0.26mm dot pitch, Invar Shadow Mask
- ◊ ErgoPanel Anti Reflection Anti Static
- ◊ 1600x1200 resolution @80Hz
- ◊ PowerManager energy saving system
- ◊ Conforms to MPR-II and TCO
- ◊ VGA Cable included

Comes with Matrox MGA-II, the fastest graphics accelerator card for F7801W. 200MHz DAC and faster 70nS VRAM for supporting 1600x1200 resolution at 76Hz high refresh rate. 24-bit true color at 1152x882 and 15- bit high color.

• 2MB+ (upgradeable to 4MB)	$3837
• 4MB	$3939

T560i

- ◊ 17" SA Trinitron 0.25mm grill pitch
- ◊ ErgoPanel™ Anti Reflection Anti Static
- ◊ CRT Surface Panel
- ◊ 1280x1024 resolution
- ◊ Dynamic Focusing/Dynamic Beam Spot Control
- ◊ Conforms to MPR-II and TCO
- ◊ PowerManager energy saving system
- ◊ Wide View Full Scanning Function
- ◊ VGA Cable included

$1519*

T660i-W

- ◊ 20" SA Trinitron 0.30mm grill pitch
- ◊ ErgoPanel™ Anti Reflection Anti Static
- ◊ CRT Surface Panel
- ◊ 1280x1024 resolution
- ◊ Dynamic Focusing/Dynamic Beam Spot Control
- ◊ Conforms to MPR-II and TCO
- ◊ PowerManager energy saving system
- ◊ Wide View Full Scanning Function
- ◊ VGA Cable included

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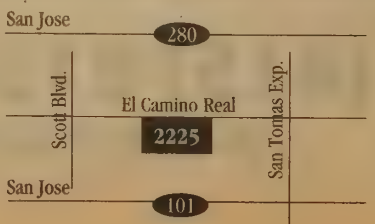

Complete Video Display Source

14" Color VGA Monitor

.39mm dot pitch

by ABONITE

$169

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For Mac and PC

by Sigma Desings

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Panasonic

PanaSync C1381i

- ◊ 14" Monitor
- ◊ 1280 x 768
- ◊ .28mm dot pitch
- ◊ Mac and PC compatible

$329

Panasonic

PanaSync/Pro
C1795E

- ◊ 17" Monitor
- ◊ 1280 x 1024
- ◊ .28mm dot pitch
- ◊ Mac and PC compatible

$1169

Graphic Cards

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8500 VL Turbo
VESA Local Bus
16.7 million color, 32-bit

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COBRA VLB
32-bit, 2MB RAM
16.7 million color

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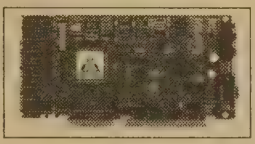

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GDM-17SE1

- ◊ 1600x1200 max resolution
- ◊ .25mm dot pitch
- ◊ 50-150Hz vertical scan range
- ◊ Energy Star compliant

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CPD-1430	14"	1024	.25	595.00
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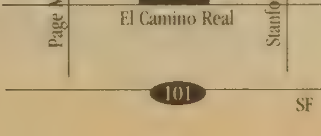

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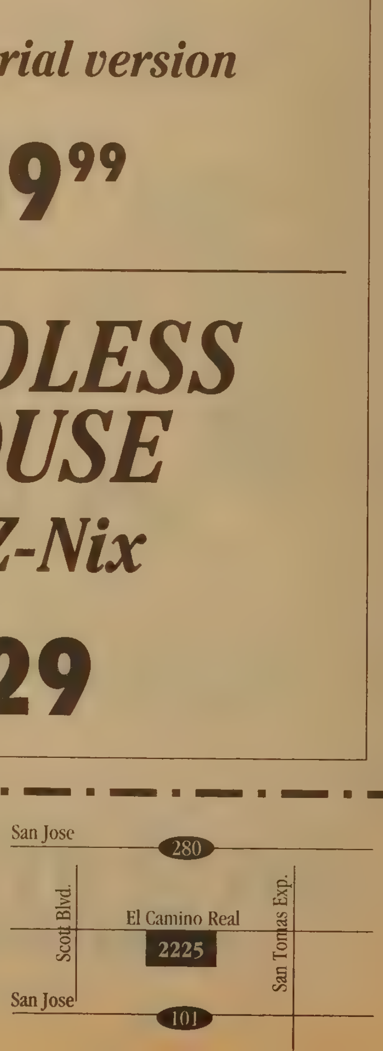

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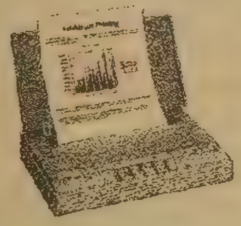

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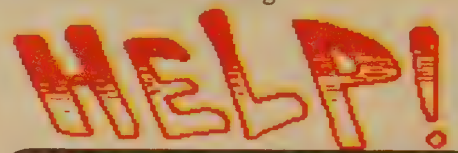

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Mac Is Ten

Trivia Quiz And Tall Tales From BMUG

BY DAVID MORGENSTERN

BMUG

This month we celebrate the tenth anniversary of Macintosh. How the years have flashed by—it only seems like a few nanoseconds. Or maybe two or three... The Mac and the dream of placing powerful computer technology in the hands of the common user are still alive, perhaps stronger than ever.

The origin of the Mac is clouded in the mythology of a television advertising flashback. If played on the screen, we would see it through the ubiquitous amber mist, perhaps set sometime in the late 1940s. All media flashbacks are now automatically staged in this golden time, even if this makes zero historical sense. But we would see the Mac development team pulling pickles out of a barrel and coding to the melodious strains of big band music.

THE BIRTH OF THE UN-BLUES

I've put together ten trivia questions in honor of the Mac's tenth birthday. Good luck with them. And no cheating!

1) The original Macintosh was a member of what computer family?

2) Shut your eyes (after you finish the question, smart aleck!). How many colors are in the Apple logo and what are their order from top down?

3) The first disk in the BMUG library was filled with anti-viral utilities. True or false?

4) Why did experienced early Macintosh owners occasionally touch the left hand side of their computers?

5) MacCharlie was a ...

a) failed Apple cross-category marketing scheme with Starkist tuna.

b) special drive and keyboard combo for users that insisted on running Lotus 1-2-3.

c) Princess Di's pet name for the Prince of Wales' favorite computer.

6) What were System 6.0's millennial implications?

7) The famous 1984 Superbowl ad featured a woman athlete running from drab thought police, who throws a large hammer into a giant video screen. The video ended with the line, "On January 24, Apple Computer will introduce Macintosh. And you'll understand why 1984 won't be like 1984." Which Superbowl was this? Which teams played and what was the final score? And how many times was the ad run afterwards?

8) The nuPrometheus League was ...

a) the title of a Sherlock Holmes adventure.

b) a pen name of a disgruntled Apple employee.

c) a support group of pyromaniacs.

9) Aldus Corp.'s PageMaker and the LaserWriter were the dynamic duo that really made the world take notice of the Macintosh. Who was Mr. Aldus?

10) In April of 1984, the Apple IIc was released in San Francisco. The title of the rollout event was ...

a) Apple II and Coffee!

b) Apple II — We Luv U.

c) Apple II Forever.

THE ANSWERS^{10}

1) "Macintosh, along with three powerful new Lisa 2 computers, forms the basis of the Apple 32 SuperMicro family of computers." Remember, it's Macintosh, not "the Macintosh."

The Lisa was the remarkable progenitor of the Mac that came in 1983 with a graphic user interface, mouse, hard drive, and a megabyte of RAM. It had a mega-pricetag of $10,000.

Lisa owners were surprised in '85, when it was renamed the Macintosh XL. In January 1986, Lisa and XL owners were given a trade-in offer. For an additional $1500 they could hand over their Lisa models and receive a 1MB Mac Plus and a Hard Disk 20. Such a deal? Sounds familiar.

2) Six colors. Green, yellow, orange, red, purple, and blue.

3) False. The first BMUG disk had lots of interesting MS-Basic utilities. There were important programs to help you make new cursors, startup screens, and fonts. Much the same mix of shareware as today!

There's a slight controversy on the first Macintosh virus. Some think it was the MacMag virus; others, nVIR. They both appeared in late 1987. nVIR is a malicious virus that was first reported in Europe. The other was written when the publisher of a Canadian Macintosh magazine, *MacMag*, decided to spread a "universal message of peace." The vehicle for this message was a computer virus. On March 2, 1988 (the first anniversary of the introduction of the Mac II and SE models), thousands of Macs had the message for peace displayed on their monitors. The virus had the good sense to then delete itself, but not before causing some unintentional mischief.

Two new viruses were discovered last November, MBDF-B and CODE-1. The latter renames an infected hard drive to "Trent Saburo" if the system is restarted on October 31 of any year. This may not sound too bad, but it also changes several internal code pointers that may lead to system failures, failures of applications to run correctly, and other problems. Please make sure you're running the latest version of Disinfectant (v3.3 at this writing) or other antiviral utility.

4) The flavors of Mac based on the original model did not have a fan and ran hot in spite of Apple's claims of "clever venting" not requiring a fan. The power supply and video circuitry, both on the upper left hand side, occasionally burned up. The cries of "dead flyback transformer" were continually

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heard in BMUG meetings and prompted some users to consider a class action suit. Like the power supplies, the whole thing fizzled.

5) MacCharlie by Dayna Communications was an IBM-compatible computer without a monitor or keyboard. It stood next to the Mac and piggybacked on its monitor, adding a row of function keys to the keyboard. Long before Windows, users could run DOS-based applications and still have cut and paste with a mouse.

6) Before System 6.0, the Macintosh only understood dates before the year 2000. This was a sticky problem for databases and contact managers looking into the future. The new Script Manager implemented algorithms that supported a thirty-five thousand range of dates.

7) The Raiders destroyed Washington 38 to 9 in Super Bowl XVIII, held in the Rose Bowl, Pasadena. Some know-it-alls will tell you that the ad was only shown once, in the game's third quarter, and then replayed in television newscasts. But it won advertising biz awards in 1984, so it must have played in a local market early one morning in late 1983 (thanks to Raines Cohen for this piece of news). For real trivia buffs, the woman was dressed in a Macintosh T-shirt and red shorts.

8) B. In 1989, a disgruntled Apple employee mailed copies of Macintosh proprietary ROM code to computer publications. This person called him/herself, the nuPrometheus League. The F.B.I. ran around the Bay Area interviewing a variety of unlikely suspects and it's now considered an honor to have been included in the investigation.

9) Aldus Manutius was a sixteenth century scholar, entrepreneur, and the inventor in 1501 of *italic type*.

10) C. The "forever" lasted only ten years, and Raines reports that there was a strong earthquake during the rollout ceremony! Holy portents! Last November, Apple dropped the venerable IIe from its price list; however, the Apple II is still alive in the expansion cards for the LC and Performa. Live long and prosper.

OUR FIRST MACINTOSH

I strongly remember seeing and using the Mac for the first time. The two actions were closely tied together. When you saw the Macintosh, uncontaminated by preconceptions about what a computer should be—you were immediately compelled to play with it. If you weren't subverted by the dark blue side of the force, MacPaint was like digital mud pie in the computer sandlot playground. It gave a *this is really neat* primal surge of endorphins through the nervous system. It was the joy of the hack for the non-hacker.

I was using our office's IBM PC and helping coworkers to learn word processing and simple DOS commands. I read about the Mac and its "problems" with PC compatibility. I (to my great shame, even to this very day) said, "Why would anyone want a Mac?" I had never seen one! A brainy coworker said that I should try it out before deciding. A moment of destiny.

Here are a couple of other BMUGers' recollections of the early daze of Macintosh:

continued on page 238

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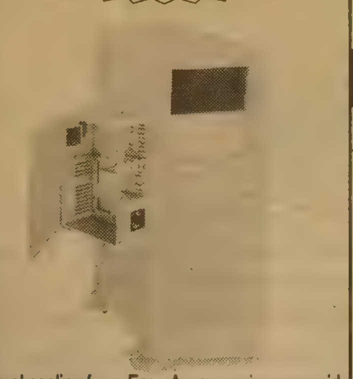

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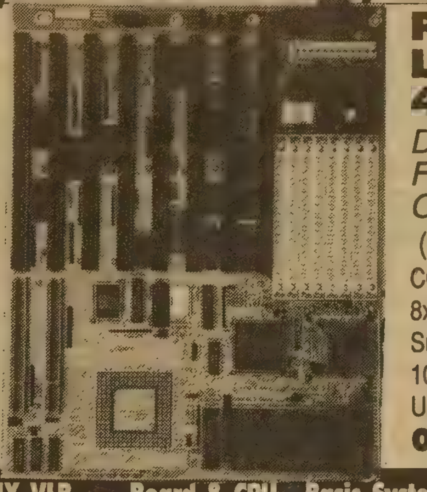

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6 Sony or Mitsumi CD-ROM	Add $175
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Sept . 1992
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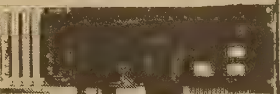

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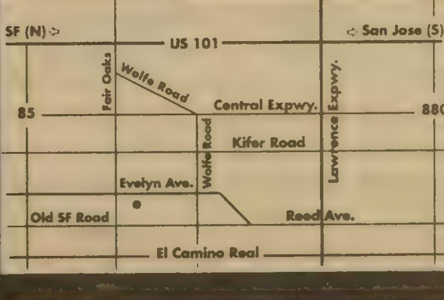


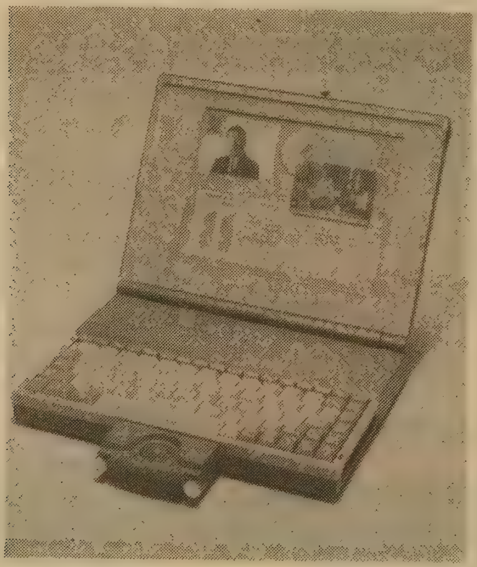
continued from page 59

your machine. In addition to the PS/2 keyboard port, there is a parallel and serial port as well as a bus connector for the addition of a SCSI adapter. There is also a Type II PCMCIA slot designed for either a fax/modem or network card ($350). Two models of fax/modem cards are available from NCR. The deluxe 14,400/14,400 baud model costs $595.

Although NCR does not provide a modem as standard equipment, it is clearly its intention that users will add this option. The preloaded software includes both BitFax and AT&T Access Plus software to facilitate sending faxes and electronic mail. NCR also provides MS-DOS 6.0 and Windows 3.1. When you power-up the machine for the first time, you are presented with an introduction that will familiarize you with the features and operation of the hardware and software. This is a terrific way to begin using your new computer. Also, all documentation is online rather than in a book. Printed documentation is available as an option.

What marks this computer as an entry-level machine is its inability to connect to a docking station. Nevertheless, with the exception of adding adapter cards, you can load this machine up pretty well.

The NCR 3150 comes with a three-year warranty—the first year including on-site service. A carrying case is included and various options are available. This is a superb machine in every respect. If you are new to computers, NCR has designed this notebook to hold your hand as you get started. If you are an old hand at computers, you will be impressed by the power and design features of this package. You can buy less expensive portables, but this is definitely a classy computer loaded with features and flexibility. ■



NCR 3150 Active Matrix Color

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increased the limit of property qualifying for this election, called Section 179 property, from $10,000 to $17,500. So you can now buy mice for everyone without exceeding the eligibility limitation.

For computer equipment to qualify for the expensing election, it cannot be "listed property." To avoid this notorious classification, the computer or peripheral equipment must be used exclusively at a regular business establishment and owned or leased by the person operating such establishment. An office in the home that passes muster under the Soliman test will do the trick.

If you are an employee, however, the office in the home must be maintained for the employer's convenience and required as a condition of employment. If you'd like more information about this, please refer to my article on "Deducting Your Home Computer," in the June 1993 *MicroTimes.*

PERSONAL HOLDING COMPANY TAX

If your corporation derives income from software sales, the income is ordinarily taxed as royalty income. A special penalty tax is designed to catch the so-called "incorporated pocketbook"—an investor trying to avoid individual income taxes by sheltering investments in a corporation. Under the 1993 Tax Act, the rate of this penalty tax, which must be paid in addition to the regular income tax, was increased to 39.6%.

Royalty payments are not subject to this penalty tax if they meet a safe harbor test for being "active computer business software royalties" (See *MicroTimes,* September 1993, "Developers and Programmers—To Incorporate or Not"). With the stiff penalty increase, it pays to double-check your computations to make sure this safe harbor is met.

SOFTWARE DEPRECIATION

Congress finally realized that a five-year depreciation life for "off-the-shelf" software is excessive, so they shortened it. Under the 1993 Tax Act, software bought after May 10, 1993 is depreciable at a fixed rate over a period of thirty-six months rather than sixty. Your program is now a little less likely to become obsolete faster than you can depreciate it.

This doesn't apply to all software. The software must still be an allowable business write-off. There's also an esoteric exception if the software was acquired in a transaction involving the acquisition of assets constituting a trade or business, in which case the depreciation life is extended to fifteen years.

Armed and forewarned with these facts, readers can now move forward into the tax season with pride and confidence that our government has not overlooked the special needs of high-tech professionals. As a consolation gift, you may also wish to arm yourself with a complimentary 1993 tax organizer, by calling my office at (510)893-5753. ■

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continued from page 134

multiplied with the growth rate using a ProGraph primitive (predefined operation), then the result is added to the old population value. Finally, the new value is inserted into the instance using a set operation and the updated instance of the class "States" is passed to the output bar. As this example highlights, the entire method was completed without writing a single line of code.

ProGraph contains all the necessary features of a complete language package. The debugging facilities are excellent. It includes, as an integral part of the language, an application builder which handles all the necessary background work and manages the Macintosh interface. The user defines the necessary windows using a wide variety of tools (buttons, text and edit fields, pop-up menus, etc., the entire process is WYSIWYG) and then proceeds to construct the necessary methods, on-the-fly if so desired, to manage the objects and data. There are excellent database primitives to build fully relational databases and, for the hackers, a wide variety of Macintosh Toolbox primitives permitting access to the low-level routines of the operating system. Additional toolboxes are for things such as communications and interfaces to UNIX databases.

My impression of ProGraph is very positive. It is a powerful programming language tool that gives users great latitude while preserving ease-of-use. The pictoral method is a great step forward from writing code line by line. I can't imagine doing that again after using ProGraph. It is, however, a tool for the serious programmer. The transition from HyperCard was not as easy as I was led to believe, and the manual could have been better. The casual computer user interested in creating a few custom applications would still be better off using HyperCard. The marketing strategy of TGS Systems, makers of ProGraph, confirms this conclusion. During the writing of this review, TGS Systems has brought ProGraph CPX to the market. This is not just an upgrade but a major reengineering of the product. CPX stands for cross-platform translation indicating that the new ProGraph can produce code which is platform independent. Part of this step is a major hike in price from a list price of $495 for ProGraph 2.5 to $1495 for ProGraph CPX. This will probably exclude all but professional programmers as potential customers, which is too bad because ProGraph 2.5 is an excellent product. ■

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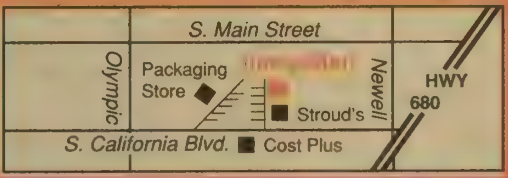

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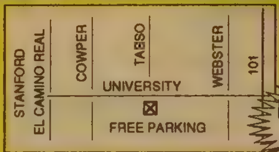

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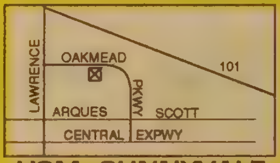

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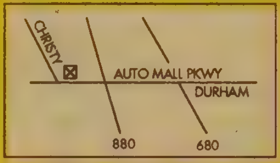

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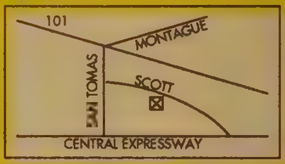

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MegaViews

- Did You Know!!

• In the January issue of PC Sources, the four top ranked systems all used the SuperVoyager motherboard from American Megatrends.

"When it's all said and done, the biggest difference between motherboards and between systems comes down to chip design."

"Among the 11 reviewed systems, five chip set vendors are represented: American Megatrends, Micronics, Opti, SIS and VLSI. Of these, without a doubt, the most efficient design is American Megatrends."

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To promote energy efficiency and reduce air pollution, the Environmental Protection Agency (EPA) has developed the Energy Star Program. This revolutionary program is a voluntary partnership between the EPA and computer companies to promote the design and sale of energy efficient systems. To qualify for the program, manufacturers must modify their products to power down to 30 watts or less during periods of inactivity.

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A) is designed on AMI's power PC Management Bios and AMI's Megakeyboard and is completely transparent to the operating system. It works with all existing operating systems and application software without any device driver or additional operating system-based drivers.

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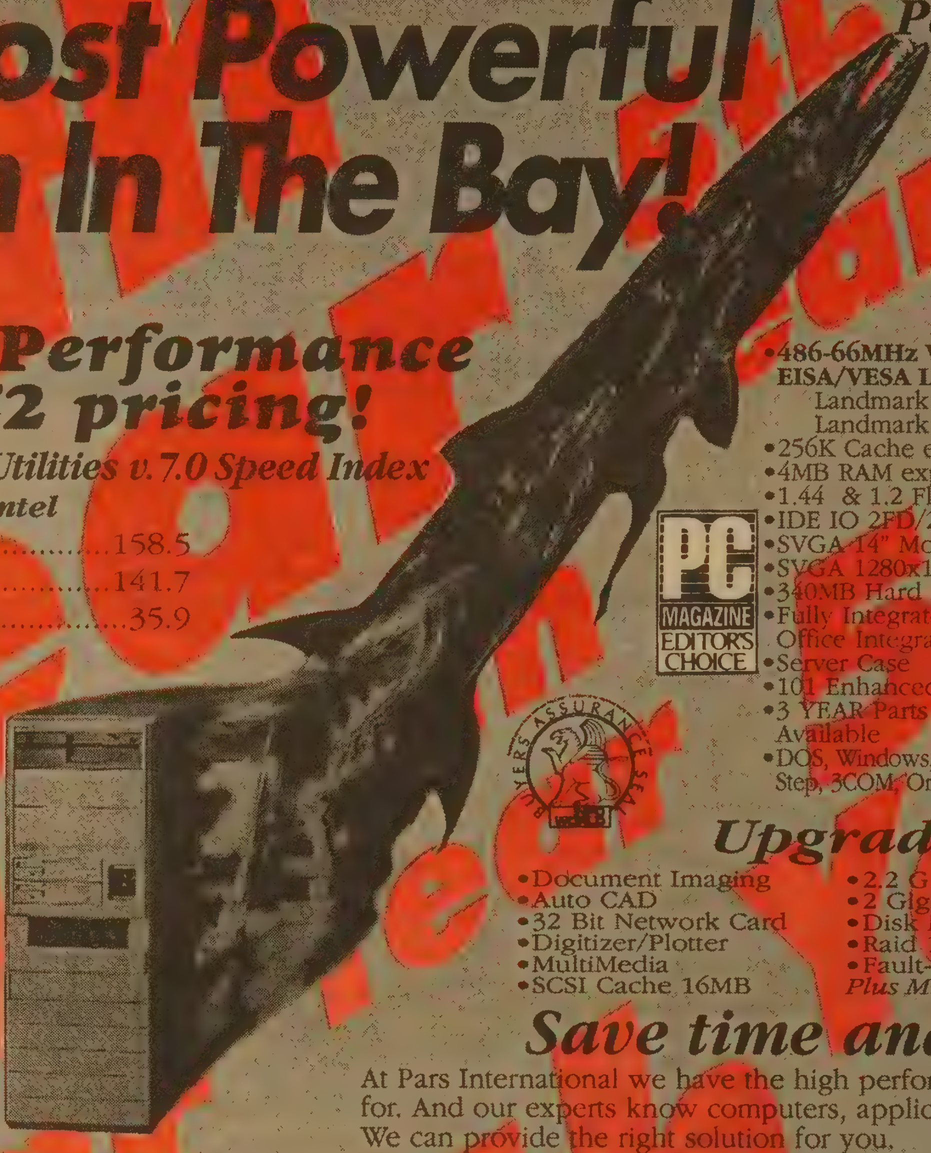

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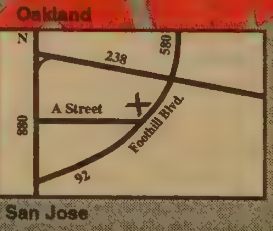


PRODUCT SPOTLIGHT

New Products

Workstation Software

NETLOCK FOR SUN

NetLOCK is a software-based security product that ensures the privacy of computer data communications traveling across local and wide area networks. It also ensures data integrity, so communications arrive intact and unaltered. Transmissions are placed in a cryptographic envelope and sent across the network with nonsensitive address information on the outside. Data security and access control are accomplished through the use of confidential keys and certificates shared between the two communicating workstations. NetLOCK can manage an unlimited number of shared keys, enabling it to provide flexible security for small- and large-scale implementations. It can be installed on laptop computers permitting users to make and complete private communication transactions via dial-up or remote network connections. ($3995 for a ten-user site license) Hughes Aircraft Co., (714)732-1637.

SUNSOLUTIONS SHOWME 2.0

ShowMe 2.0 is a complete, easy-to-use desktop video conferencing solution that enables workstation users to collaborate interactively, in real time, with a full range of video, audio, and screensharing tools. It con-

Errata

In the December 14 issue of *MicroTimes*, the price of the Sharp LC-10V1 monitor was incorrectly listed as $798. The correct price of the monitor, which is currently available only in Japan and has no exact price in US dollars, is approximately $7300. For more information, call: 1-800-BESHARP (237-4277).

UPDATES

RECALL

NEC has recalled its **PC-17-01** and **PC-17-02** Ultralite computer laptops. These models, sold between December of 1988 and April of 1990, contain defective batteries that can cause explosion or fire. Call: 1-800-237-2913.

UPGRADE

✧ **ACI** shipped **4th Dimension 3.1** and **4D Server 1.1**. Upgrades are free to users who purchased 4D or 4D Server on or after October 15, 1993. Other users can buy the 4D 3.1 upgrade for $59, the 4D Server upgrade for $149. ACI US, Inc., 20883 Stevens Creek Blvd., Cupertino, CA. (408)252-4444.

✧ **Claris** released **MacWrite Pro v1.5**. Registered MacWrite Pro owners can upgrade for $29. Purchasers of MacWrite Pro v1.5 before March 31, 1994, can select one of three complimentary bonus software packages. Claris Corp., 5201 Patrick Henry Dr., Box 58168, Santa Clara, CA 95052-8168. (408)987-7000.

✧ **CoSA** shipped **After Effects 2.0 Professional Version**. Registered users who purchased After Effects 1.x through CoSA or a CoSA reseller can upgrade for $395 until March 1, 1994. Registered users who received After Effects 1.x bundled with SuperMac's Digital Film can purchase v2.0 for $995 until March 1. CoSA, 14 Imperial Pl., Ste. 203, Providence, RI 02903. (401)831-2672.

✧ **CoSA** shipped **Effects Pac vol. 1, v2.0** and **Free Effects**. Designed to work with After Effects 2.0, they are available free of charge to registered users of that software. The cost of Effects Pac vol. 1, v2.0 and Free Effects is otherwise $199. CoSA, 14 Imperial Pl., Ste. 203, Providence, RI 02903. (401)831-2672.

✧ **Gazelle** released **Back-It for Windows 2.0**, which retails for $79. Gazelle Systems, Inc., 305 N. 500 W., Provo, UT 84601. 1-800-786-3278.

✧ **Intuit** announced a new trial edition of **Quicken for DOS**, **Windows**, and **Macintosh**. The cost is $8. Intuit, PO Box 3014, Menlo Park, CA 94026-3014. 1-800-624-5071.

✧ **Masterclips** announced **Masterclips—The Art of Business v2.0**. Masterclips, Inc., 5201 Ravenswood Rd., Ste. 111, Ft. Lauderdale, FL 33312. 1-800-899-7440.

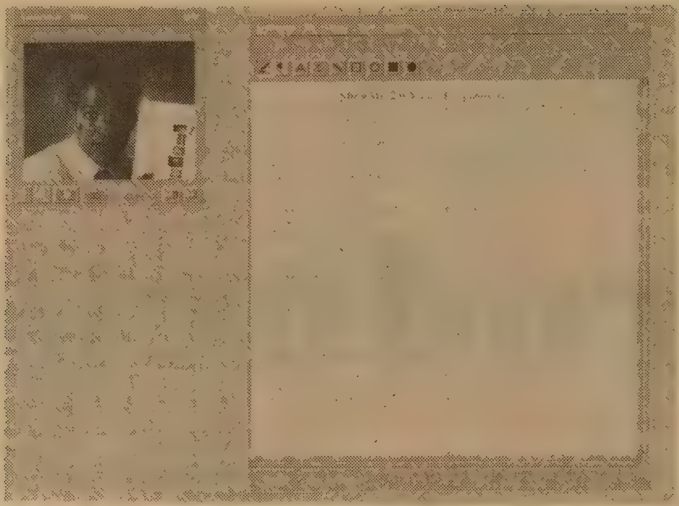
✧ **Micrografx** shipped **ABC FlowCharter 3.0**. Registered users can upgrade for $99 per copy. ABC FlowCharter is available for a limited time for a retail price of $199.95. Micrografx, Inc. 1303 E. Arapaho Rd., Richardson, TX 75081. (214)234-1769.

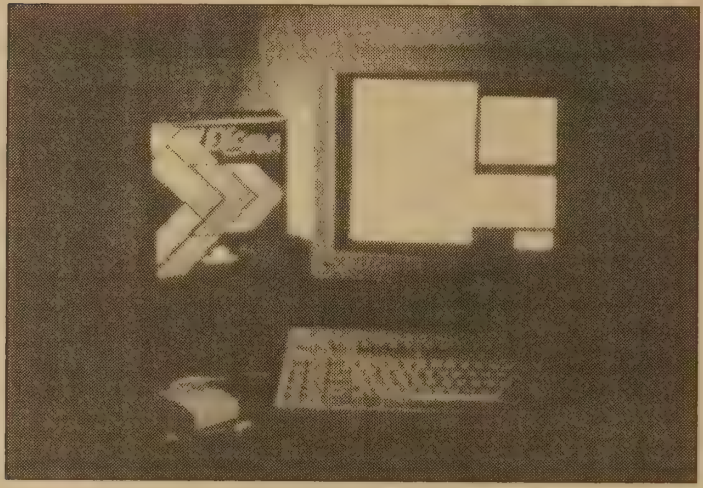
✧ **Opcode** released **Vision 2.0**. Upgrades from any earlier version of the software are available for $99.95. Opcode Systems, Inc., 3950 Fabian Way, Ste. 100, Palo Alto, CA 94303. (415)856-3332.

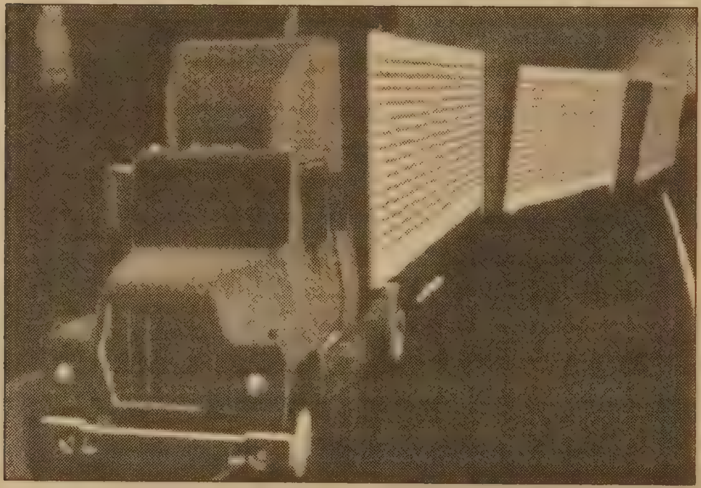
✧ **Ray Dream** shipped **Ray Dream Designer 3.0.**, which is available at a retail price of $349. Ray Dream, Inc., 1804 N. Shoreline Blvd., Mountain View, CA 94043. (415)960-0768.

✧ **Softool** announced **CCC/Manager 2.1 for OS/2**. Softool Corp., 340 S. Kellogg Ave., Goleta, CA 93117. (805)683-5777.

✧ **TeLeVell** released **TeleSell 4.0**, which costs $199 for single users and $2495 for multi-users. TeLeVell Inc., 1629 S. Main St., Milpitas, CA 95035. (408)956-0511.







Top to bottom: ShowMe 2.0 from Sunsolutions; Introl FlexStor for Sun; VisLab for Silicon Graphics.

sists of ShowMe Video, ShowMe Audio, ShowMe SharedApp, and ShowMe Whiteboard. The capabilites work together, so users can take advantage of any or all of them at the same time. ShowMe is based on the Motif GUI and operates on SPARC workstations over TCP/IP networks. Versions for HP and IBM workstations, and Intel-based PCs running Windows and Solaris are planned for 1994. ($3270 for a single right-to-use license. A video camera and a SunVideo card are included with each license, along with CD media and documentation) Sun Microsystems, Inc., 2550 Garcia Ave., MS MTV02-208, Mountain View, CA 94043-1100. (415)962-9421.

INTROL FLEXSTOR FOR SUN

FlexStor offers a distributed Hierarchical Storage Management (HMS) software solution for Sun OS- and Solaris 2.x-based workstations and servers, and operates under both the Open Look and Motif GUI. FlexStor minimizes the cost of managing and storing information by automatically and transparently migrating data files to the most cost-effective medium based on user-definable criteria. Once installed, no further administration is required. The software supports transparent migration between online disks, near-line optical disks or tape libraries, and off-line tape libraries, and dynamically optimizes online disks for maximum performance. In addition to client level file migration, server migration is also supported. (Prices start under $4000 and vary depending on the type of library storage device and number of migration clients in the network) Introl Corp., 2817 Anthony Ln. S., Minneapolis, MN 55418-3254. (612)788-9391.

VISLAB FOR SGI

VisLab is a comprehensive 3-D animation and visualization software package for Silicon Graphics hardware. With VisLab, you are rendering images in hardware instead of the software. This means that you can render a complex frame in a few seconds instead of a few minutes or hours, and can also revise easily. VisLab contains a library of kinematics—laws of motion that can be applied to your animations—that make objects move as they must in the natural world. VisLab's 3-D modeler helps you create simple images, and a complete library of detailed geometric tools helps you customize them. VisLab even allows you to mix special effects and animation insets into a production before you render it. ($9500) Engineering Animation, Inc., 2625 North Loop Dr., Ames, IA 50010. (515)296-9908.

AMTEC TECPLOT 6.0

Tecplot v6.0 is a versatile data visualization and technical plotting software package for scientists and engineers. It is interactive, doesn't require programming, and allows easy creation of XY, 2-D, and 3-D surface plots. An optional extension called 3DV is also offered with Tecplot that adds the capability to visualize volumetric data as iso-surfaces, 3-D streams, selected IJK-planes, point clunds, and arbitrary data slices. Tecplot doesn't impose rectangular structure to data points. It allows visualization of data in whatever mesh structures exist including: rectangular, curvilinear, non-othogonal, triangular, quadrilateral, tetrahedral, 8-node finite-element brick, and even randomly positioned data points. In its multiwindow environment up to sixty-four plots can be created simultaneously and superimposed or placed side by side. TelePort is available for IBM compatible PCs running DOS, most UNIX workstations, and DEC VAX stations running VMS. ($694 for the PC and $1695 for workstations) Amtec Engineering, Inc., PO Box 3633, Bellevue, WA 98009-3633. 1-800-676-7568.

PC Hardware

PARS POWER SERIES

Offering Pentium performance at 486DX2 prices, the Pars Power Series is perfect for a file server, engineering workstation, or software development system. It features a 66MHz, 486 VESA Local Bus (upgradable to EISA/VESA Local Bus), 4MB of RAM (upgradable to 256MB), 1.44MB and 1.2MB floppy drives, 340MB hard drive (upgradable to 2.2GB), SVGA 14" monitor, server case, and 101-key enhanced keyboard. The Pars Power Series uses the latest NASA technology to achieve higher performance than other similar systems available—yielding a score of 158.5 using Norton Utilities v7.0 CPU Speed Index, compared to 141.7 for Intel's 486DX2-66 and 35.9 for the 386DX-33 CPU. ($1699) Pars International Corp., 22441 Foothill Blvd., Hayward, CA 94541. (510)733-0103.

Continued on page 194

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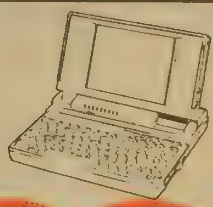

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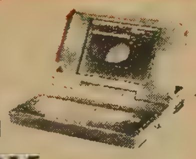

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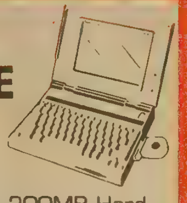

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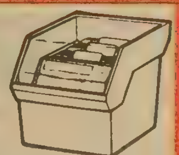

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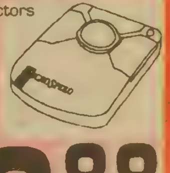

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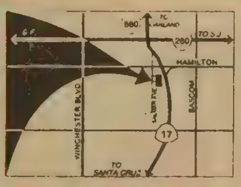

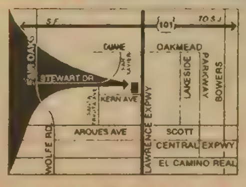

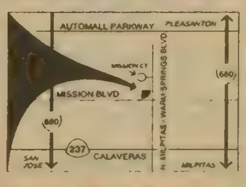

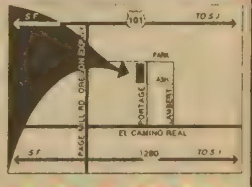

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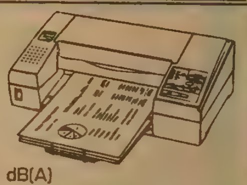

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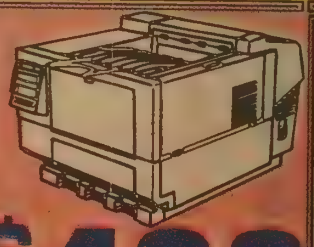

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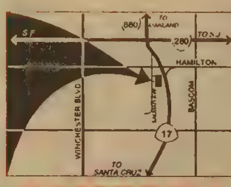

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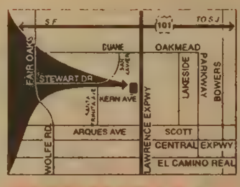

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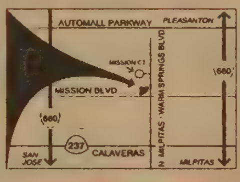

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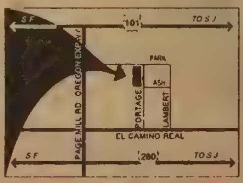

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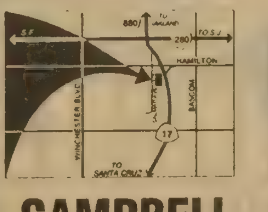

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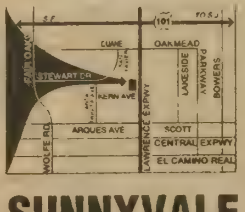

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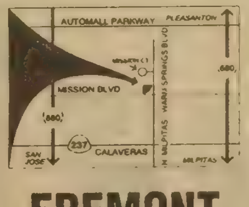

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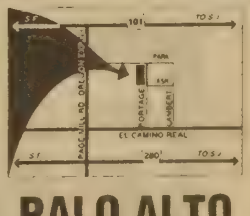

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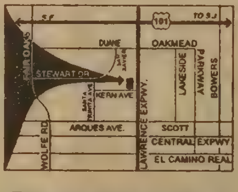

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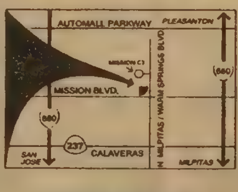

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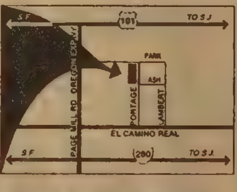

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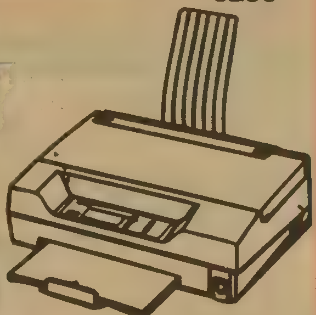

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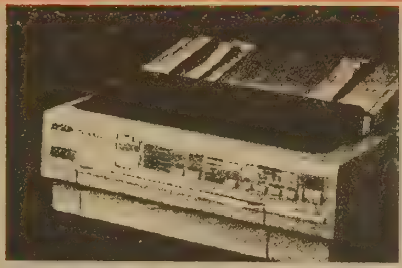

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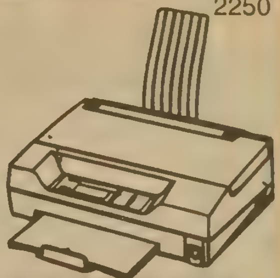

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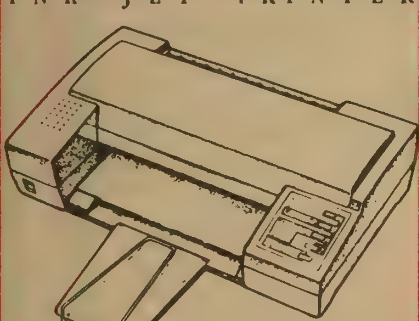

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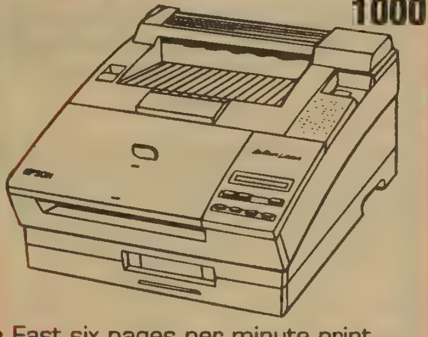

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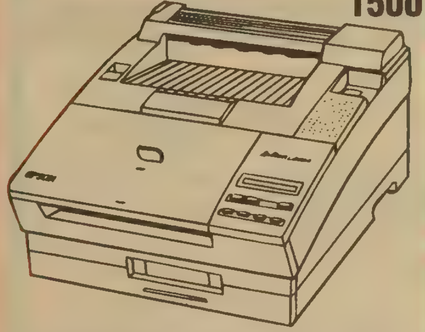

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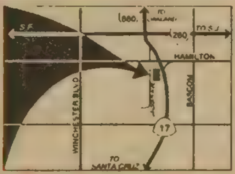

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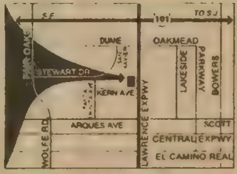

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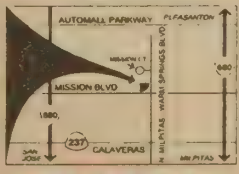

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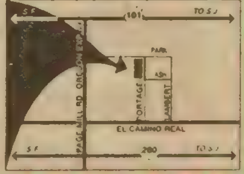

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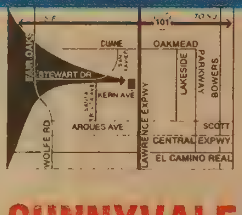

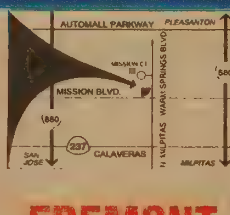

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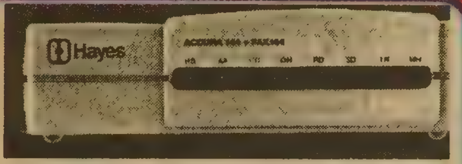

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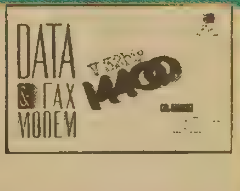

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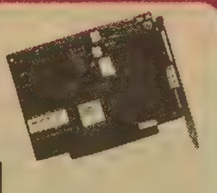

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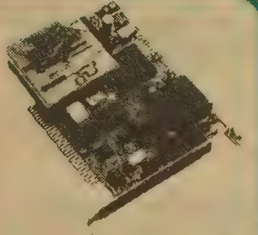

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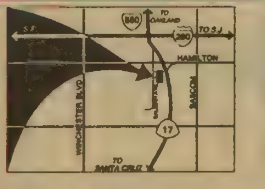

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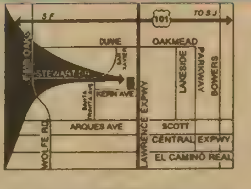

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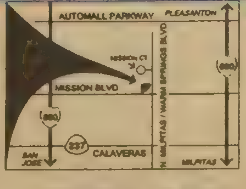

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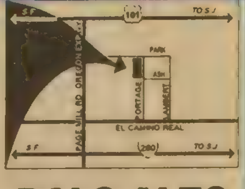

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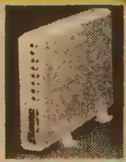

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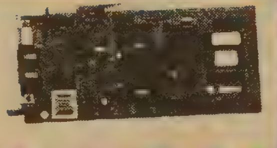

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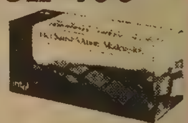

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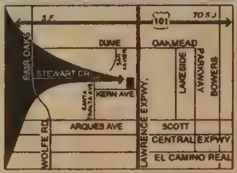

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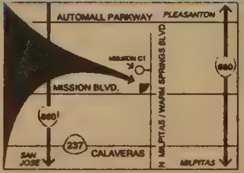

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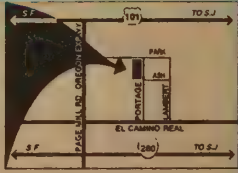

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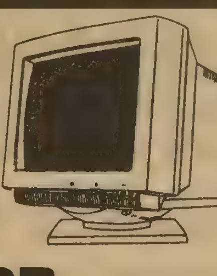
MONITORS

NEC



.28 1024 X 768 NON-INTERLACED 14" SVGA MULTISYNC MONITOR

14" .28 1024 X 768 • Non-Interlaced
Non-Glare
• Low ELF & VLF
110/220 Volt

$339

#1813867

NEC

4FGE 1024 X 768 NON-INTERLACED 15" SUPER VGA MONITOR

1024 X 768
Non-Interlaced
Flat Screen Monitor
4FGE

$749

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SONY.

GDM-17SE1 MONITOR

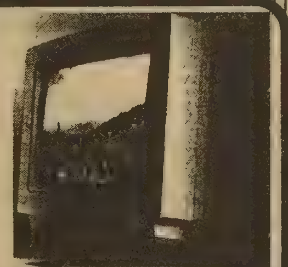
NEW!

17" 1600 X 1200 RESOLUTION .25 PITCH;
FLAT SCREEN
DIGITAL CONTROLS.

$1299

#1852983

MITAC



1280 x 1024 NON-INTERLACED 15" SUPER VGA MONITOR w/DIGITAL CONTROL

1280 x 1024
• 15" Large Flat Screen
.28 Dot Pitch
• Non-Interlaced
• Digital Control

$399

#1855827

MITAC

17" HI-RES 1024 x 768 NON-INTERLACED SUPER VGA MONITOR

1024 x 768
• 17" Large Screen
.31 Dot Pitch
• Non-Interlaced • Cable

$499

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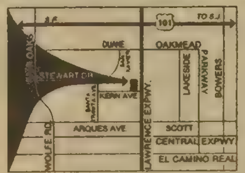

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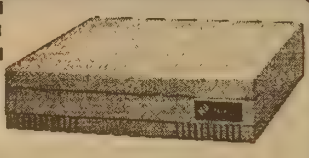
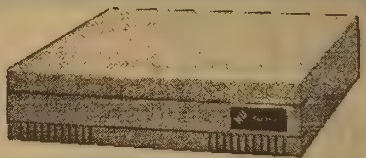
HARD DRIVES FOR MAC



1.2 GIGABYTE EXTERNAL HARD DRIVE FOR MAC

MODEL 1.2 #1850682

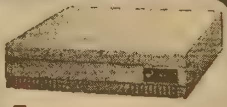
$999



105MB EXTERNAL HARD DRIVE FOR MAC

MODEL 105 #1842131

$249



170MB EXTERNAL HARD DRIVE FOR MAC

MODEL 170 #1838592

$369

210MB EXTERNAL HARD DRIVE FOR MAC

MODEL 210 #1838628

$449

340MB EXTERNAL HARD DRIVE FOR MAC

MODEL 340 #1850659

$499

EXTERNAL SYQUEST 88C MAC

88MB EXTERNAL SYQUEST FOR MACINTOSH
Read 44MB Write 88MB Syquest
SYQ88C
#1838721

$479

44MB SYQUEST DRIVE FOR MAC

SYQ44
#1838732

$399.99

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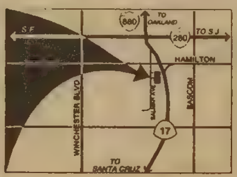

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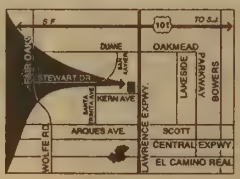

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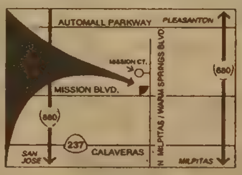

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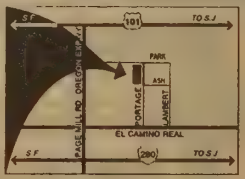

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HARD DRIVES

Maxtor

131MB 3.5" IDE HARD DRIVE

3.5" X 1" HT • 15MS Access Time 7131A #1803646

$189

CONNER

170MB 3.5" IDE HARD DRIVE

17ms Average Access • 32K Buffer • 1" Ht. • Low Power Consumption CP30174E #1656815

$209

WESTERN DIGITAL

210MB IDE HARD DRIVE

13 msec Access • 2 Year Warranty AC1210 #1828522

$229

Maxtor

213MB 3.5" IDE HARD DRIVE

3.5" X 1" HT. • 15MS Access Time 7213A #1694044

$209

Seagate

214MB IDE HARD DRIVE

1"HT • 3.5" Size ST-3243A #1853227

$219

Maxtor

245MB 3.5" IDE HARD DRIVE

3.5" Format • 1" Height • 15ms Access
MXT-7245A #1759934

$229

CONNER

250MB 3.5" IDE HARD DRIVE

12ms Average Access • 1" HT. • 3.5" Form Factor
CP30254 #1795356

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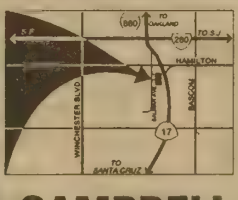

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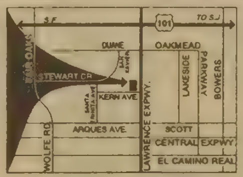

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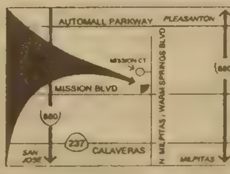

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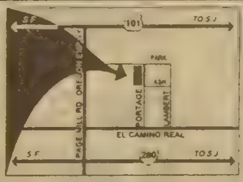

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HARD DRIVES

CONNER
340MB 3.5" IDE HARD DRIVE

$279

13msec Access • 3.5"
CP30344 #1825736

Quantum™
340MB 3.5" IDE HARD DRIVE

$299

12msec Access Time • 128K Cache #1874707

Maxtor
340MB IDE HARD DRIVE

$299

1" HT. • 15ms Access Time • 345MB Formatted Capacity
7345A #1781762

CONNER 540MB 3.5" IDE HARD DRIVE

12ms Fast Access • 3.5" Format • 256K Buffer
IDE Interface
#1843028

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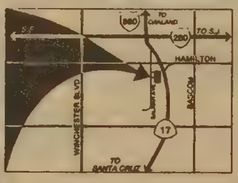

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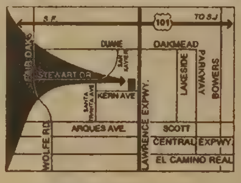

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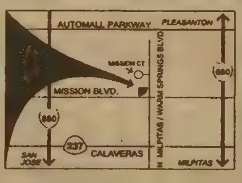

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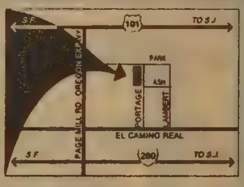

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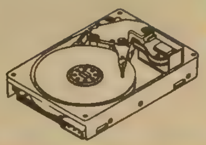
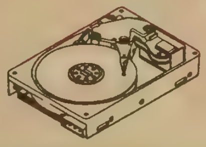
SCSI HARD DRIVES

Maxtor
240MB SCSI HARD DRIVE
3.5" X 1"HT. • 15msec Access
7245S #1807673



$299

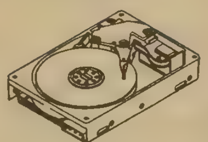
Maxtor
345MB SCSI HARD DRIVE



3.5" X 1"HT. • 14msec Access
7345S #1807673

$398

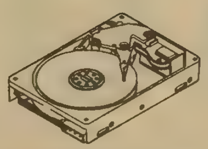
CONNER
540MB SCSI HARD DRIVE



3.5" X 1"HT. • 10msec Access
CP-30540 #1802221

$699

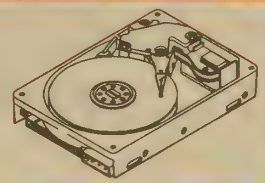
Maxtor
540MB SCSI HARD DRIVE



3.5" X 1"HT. • 8.5msec Access
540S #1802173

$699

TOSHIBA
1.2 GIGABYTE SCSI HARD DRIVE



$1099

12MS Access • 3.5" Size MK538FB #1769591

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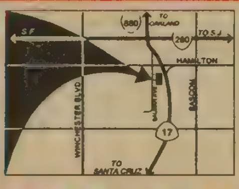

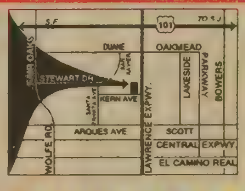

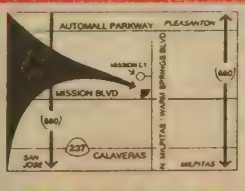

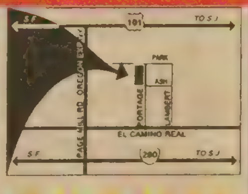

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BACK-UP DRIVES

120MB TAPE BACKUP

- Average Capacity of 120MB with data compression
- Plugs into floppy controller
- Built-in error correction code
- 90 days warranty

Excel 60F #1871531

$79

CONNER
250MB INTERNAL TAPE BACK-UP

WITH DC12120 TAPE CARTRIDGE
C250MQT #1825747

$159

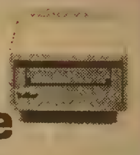
IBM
250MB TAPE EXTERNAL BACK-UP

Data and Power Cables with Software and Tape
TD632 #1780185

$269

IBM Business Partner
Authorized Personal Computer Dealer

COLORADO MEMORY SYSTEMS INC.



Jumbo Trakker 250MB Parallel Printer Port Tape External Backup System

Plug and Play. No hardware installation. Trakker connects to your computer's parallel printer port.
Full Compatibility. Works with any computer with an IBM compatible parallel printer port.
Dual Connectors on Back Panel. Trakker and printer share a parallel printer port.
Trakker Portability. Easily shuttles between laptops and desktops.
QIC-40. Industry Standard Recording Format for data interchange.
JT-20 #1740806

$369

FUJITSU

128MB EXTERNAL MAGNETO OPTICAL

Includes cartridge, installation kit and manual #1842496

$899

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5 GIGABYTE DATA TAPE BACK-UP

4MM SCSI • 783KB Per Second • About 47MB Per Minute #1842153

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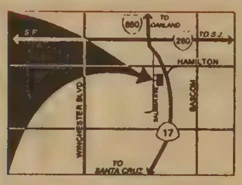

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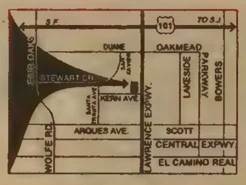

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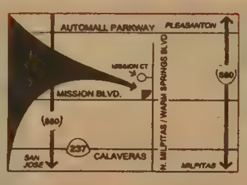

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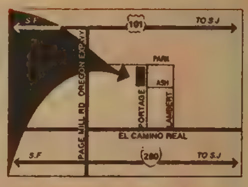

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CD-ROM

PHILIPS INTERNAL CD-ROM DRIVE

Sony Compatible • 375ms Access Time
153.6KB/S Transfer
Cable, Drivers and Interface Included
#1853249

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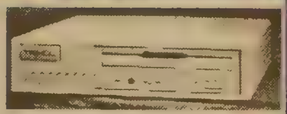
OMNI CD MULTIMEDIA UPGRADE KIT

- 300 KB/sec data transfer rate
- Multi-session photo CD compatible
- 320ms access rate • 680MB data capacity
- 64KB RAM buffer • Daisy-chain up to four Creative Labs drives
- CD-ROM XA ready

#1825714

$277

CREATIVE
CREATIVE LABS, INC.

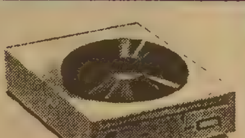


TEXEL DOUBLE SPEED EXTERNAL CD-ROM DRIVE

335KB/sec Data Transfer Rate
240ms Average Access Speed
64KB Buffer
CD-XA and Multisession Photo CD Support
DM-5028
#1835991

$369

REVEAL
COMPUTER PRODUCTS



INTERNAL DOUBLE SPEED CD-ROM DRIVE

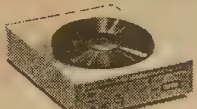
Internal CD-ROM drive, Double Speed, 320ms access time, 300K Bytes data transfer rate. Multi-session Photo CD ready. Includes mounting hardware, cables and installation video.

Includes Free Installation Video

$199

CDD02
#1853032

REVEAL
COMPUTER PRODUCTS



INTERNAL DOUBLE SPEED CD-ROM DRIVE WITH SIX CD TITLES

Internal CD-ROM drive, Double Speed, 320ms access time, 300K Bytes data transfer rate. Multi-session Photo CD ready. Includes mounting hardware, cables and installation video. Six CD software titles.

Includes Free Installation Video

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CDD11
#1853043

MICROSOLUTION MOBILE MEDIA

BACKPAK

EXTERNAL CD-ROM

NO INTERFACE REQUIRED

External Portable CD-ROM Connects To Parallel Port
150KB Transfer Rate

$365

BP160550CD
#1798728

CD-ROM DRIVE

- Kodak Multi-session Photo CD Compatible
- Double Speed - 300kbs / 350 ms - MPC Level II
- Supports CD-XA, CD-DA, CD-I Formats
- Motorized Tray Loading and Front Panel Controls
- Interface Card and Cable Included
- 64k Buffer

CDS-3110 #1849611

ORCHID

$228

TOSHIBA DUAL SPEED INTERNAL CD-ROM

SCSI CD-ROM • 200ms Access
256K Cache
330KB/sec Transfer Rate

$341

XM3401B
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MULTISPIN 3Xe EXTERNAL CD-ROM

450KB/sec Transfer Rate • 195ms Access Time
256K Cache • Photo CD Compatible
Two Year Warranty
CDR-600
#1839180

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MultiSpin
CD-ROM READER
NEC

$569

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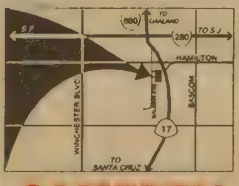

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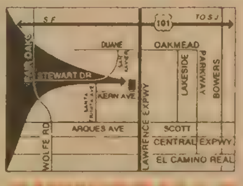

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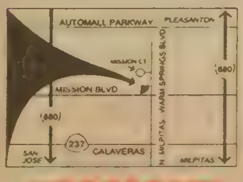

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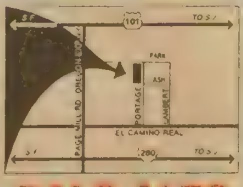

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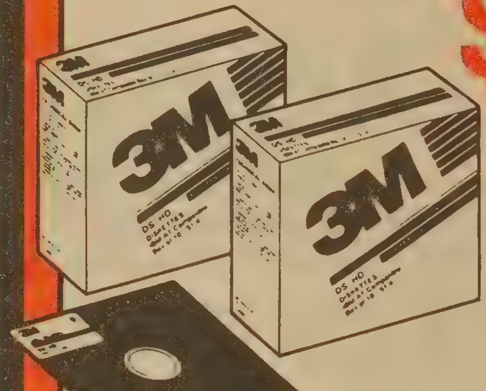

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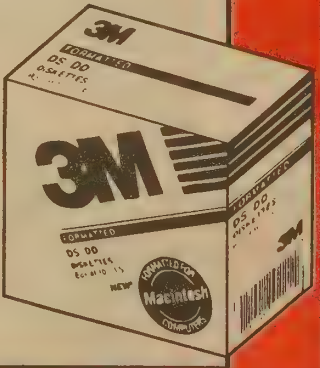

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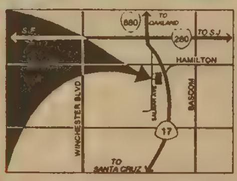

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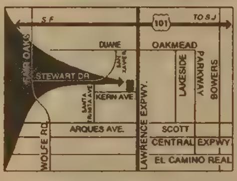

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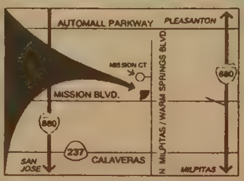

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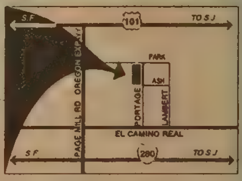

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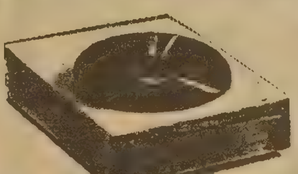

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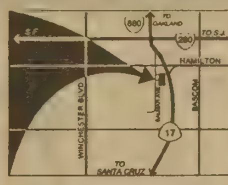

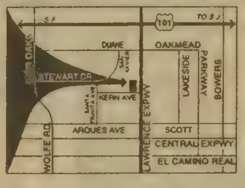

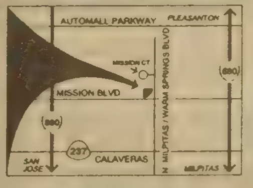

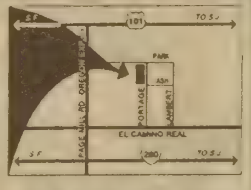

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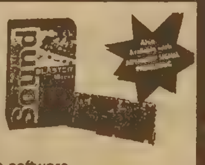

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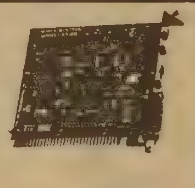

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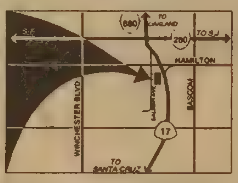

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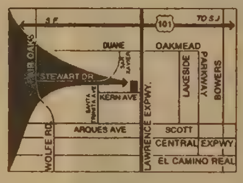

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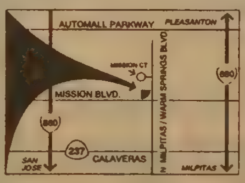

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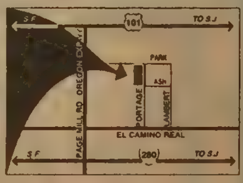

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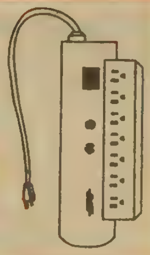

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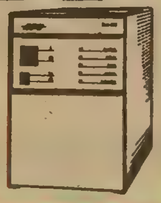

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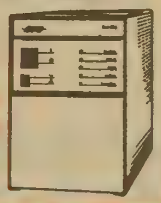

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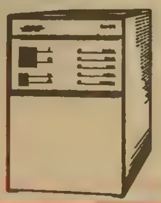

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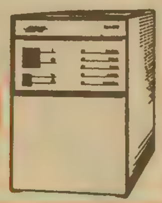

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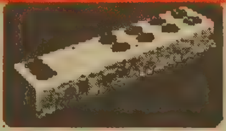

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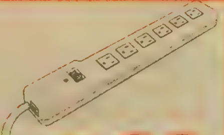

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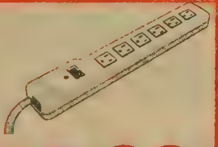

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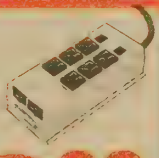

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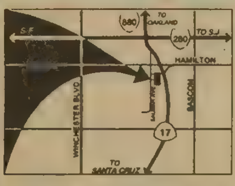

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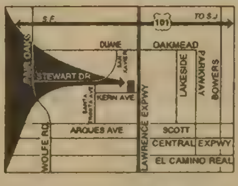

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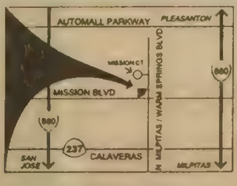

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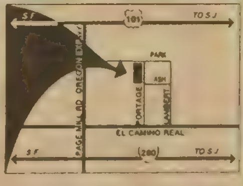

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Simplify your work and boost productivity with WordPerfect, Quatro Pro and Paradox. Individually, they've won more awards than any other software in there class. Together, they make your job easier by helping you integrate all your tasks. For owners of any DOS or Windows version(s) of WordPerfect, Quatro Pro, or Paradox.

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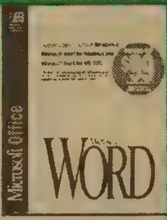
Microsoft Word 6.0 Upgrade for Windows



MS Word 6.0 is the easiest version of Word ever, with features like AutoCorrect that fixes typos for you and AutoFormat that makes your text look great automatically. The secret is IntelliSense technology. Get it in Word.

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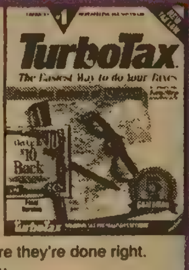

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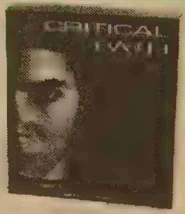
CRITICAL PATH



Critical Path is a new level of CD-ROM realism and excitement, 3D Motion video, explosive sound effects and music soundtrack. It's a gritty, realistic cinematic experience.

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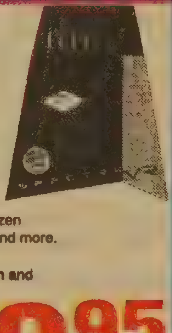

Spectre VR is not just another game, it's another reality. Features:

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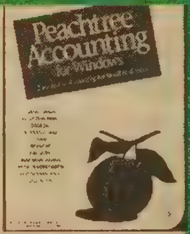
Peachtree Accounting 2.0 for Windows



You'll love the efficiency and convenience of Peachtree Accounting for Windows. Entry screens are designed to look like the forms they represent, and you can choose program options quickly from the command bar at the top of your screen.

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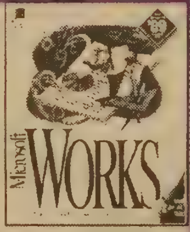

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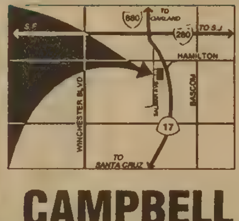

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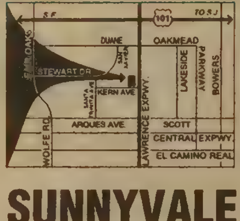

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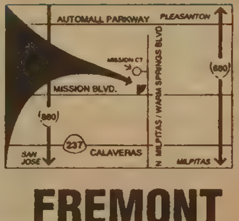

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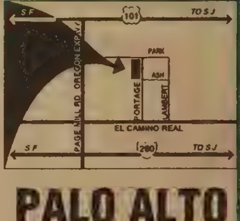

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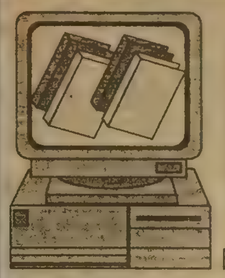

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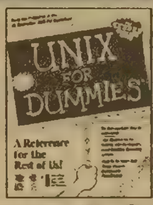

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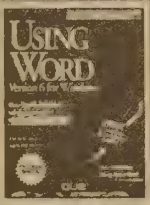

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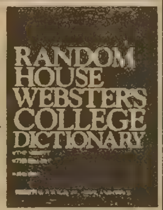

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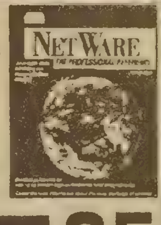

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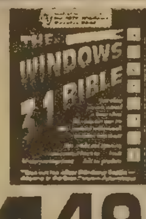

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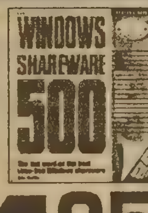

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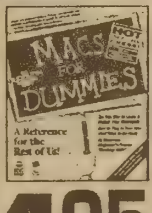

You thought the Macintosh was supposed to be easy, didn't you? That was before you found out there were dozens of different models... before they started lobbing terms like ROM and virtual memory at you... and before the Mac started making funny beeps.

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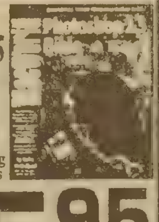

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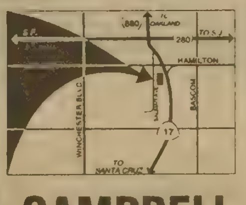

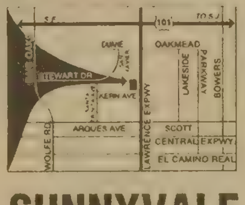

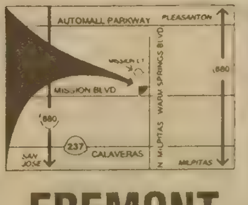

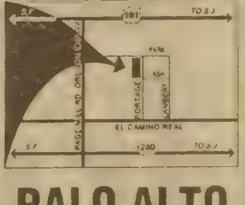

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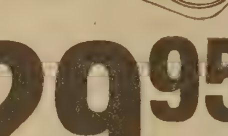

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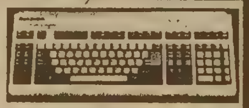

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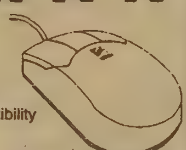

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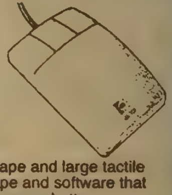

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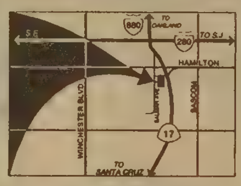

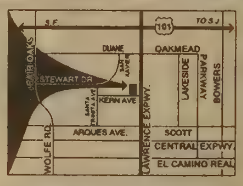

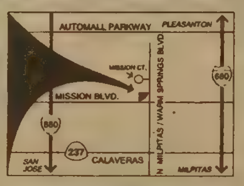

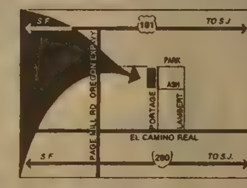

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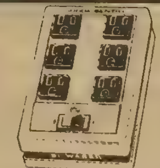

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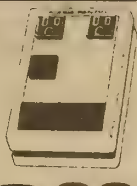

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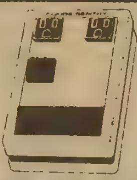

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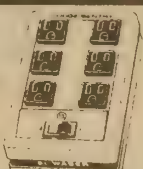

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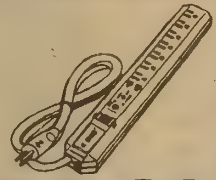

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$6.99

WABER, INC.
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EP6S METAL SURGE

EP6S 210 JOULE
6 OUTLET SURGE PROTECTOR
EMI/RFI NOISE REJECTION
5 YEAR WARRANTY $250 CNCT EQP
#1840900

$12.99

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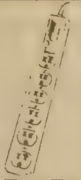

FULL METAL JACKET 6 OUTLET SURGE PROTECTOR

Case of drawn steel with baked enamel. 210 joules energy dissipation. Clamping response time < 1 nanosecond Maximum surge voltage 6000V 6 foot cord DG206
#135495

$16.99

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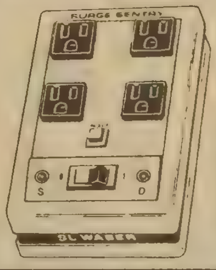

DSD SURGE 4-OUTLET

PROTECT YOUR COMPUTER EQUIPMENT FROM VOLTAGE SURGES, BROWNOUTS, BLACKOUTS, AND EMI/RFI NOISE INTERFERENCE.
• 695 JOULES RATED • 1PICOSECOND RESPONSE TIME • VISUAL SURGE INDICATOR AND 15 AMP RESETTABLE CIRCUIT BREAKER.
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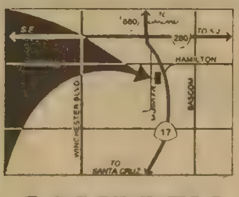

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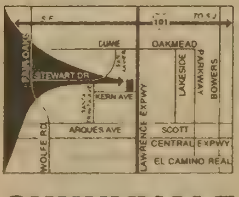

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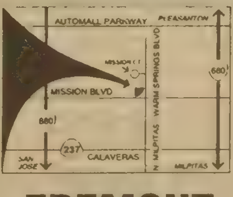

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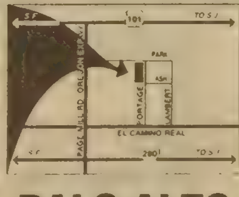

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PAC TEL PAGING **MOTOROLA**

LIFESTYLE PAGER

When your lifestyle demands that you be on the move, this Motorola Pager will help you keep important lines of communication open. Its 12-digit LCD display, 6 number memory, and tone or vibrate message alert make this Motorola Pager an invaluable communication and business tool at only...

$\$59^{95}$

Model
Lifestyle Pager
#1825851

MOTOROLA

CELLULAR TRAVELER PHONE

Motorola's traveler phone combines a compact design with a full 3 watts of power at the incredibly low price of only...

$\$134^{95}$*

*After $25 Instant Service Activation Rebate. Price w/o Activation $\$159^{95}$

Model S-3230
#1751866

MOTOROLA

TRANSPORTABLE HANDHELD CELLULAR TELEPHONE

Motorola's most popular Hand Held Phone has all the right features! This compact unit will allow you to talk for up to 90 minutes, keep 30 numbers in memory, and much more!

$\$139^{95}$*

*After $25 Instant Service Activation Rebate. Price w/o Activation $\$164^{95}$

Model 8000-HX
#1502549

MOTOROLA

CELLULAR FLIP PHONE

This premium value cellular phone from Motorola comes equipped with 30 number memory, LED display, call timer, signal strength meter, a battery with 75 minute total talk time, and an overnight charger for only...

$\$239^{95}$*

Model
DPC-550
#1635999

*After $25 Instant Service Activation Rebate. Price w/o Activation $\$264^{95}$

MOTOROLA

ALPHA MICRO-TAC CELLULAR PHONE

If it's small and lightweight you're looking for, this is the cellular phone for you! With its 101 alpha numeric memory, a desktop charger, and standard battery, this technologicaly advanced cellular phone can be yours for only...

$\$358^{95}$*

Model
DPCAC
#1635988

*After $25 Instant Service Activation Rebate. Price w/o Activation $\$383^{95}$

MOTOROLA

MICRO TAC LITE CELLULAR PHONE

Weighing in at 7.7 ounces and measuring 11.6 cubic inches, this is one of the lightest and most advanced cellular telephones available. With 100 alpha numeric memory, retractable antenna, standard battery, and desktop charger, you can receive state of the art performance and design for only...

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Model
MICRO
TAC LITE BASE
#1750739

*After $25 Instant Service Activation Rebate. Price w/o Activation $\$489^{95}$

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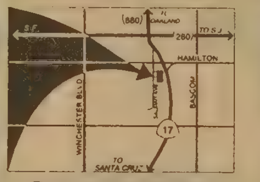
Service Activation Not Required. No Sales To Dealers Or Resellers. Limit One Per Family.



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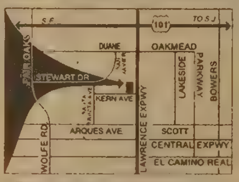

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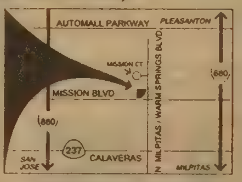

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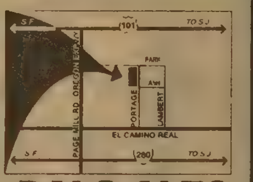

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ANSWERING MACHINES

Panasonic

ANSWERING MACHINE

Answering system with Auto-Logic Operation, Tone Remote Control, Digital Display, Message Memo Recording and Remote turn on, Auto-Logic Operation Automatically Rewinds, Plays Messages, Stops at the Last Message and Resets itself at the Touch of One Button.

Model
KX-T1000
#1498194

$\$37^{99}$

Panasonic

DUAL MICRO CASSETTE ANSWERING SYSTEM

Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

MODEL
KX-T2100
#1740208

$\$59^{95}$

Panasonic

DUAL MICRO CASSETTE ANSWERING SYSTEM

W/ VOICE TIME/DAY STAMP

Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

MODEL
KX-T2300
#1740219

$\$89^{95}$

MULTI-LINE BUSINESS PHONES

Panasonic

TWO LINE PHONE

A two line phone doesn't have to cost a fortune. Panasonic has the low cost answer for you. This unit has a convenient auto dialer, conference calling and much more!

MODEL
KX-T3110
#1505313

$\$49^{95}$

Panasonic

2-LINE SPEAKERPHONE W/ LCD DISPLAY

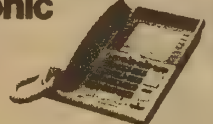
From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

MODEL
KX-T3175
#1745122

$\$89^{95}$

AVAILABLE IN BLACK OR WHITE

Panasonic



3-LINE SPEAKERPHONE WITH LCD DISPLAY

From Panasonic comes this fully featured 3-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 48-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

MODEL
KX-T3185
#1768039

$\$159^{95}$

AVAILABLE IN BLACK OR WHITE

10 CHANNEL CORDLESS PHONES

Panasonic

10 CHANNEL CORDLESS PHONE

Most cordless phones have a very short battery life, but this one can last up to 7 days in the standby mode! Add a flexible antenna, 10 number memory, 10 channels, paging and you have an excellent value at...

MODEL
KX-T3710
#1511389

$\$69^{95}$

Panasonic

10 CHANNEL CORDLESS SPEAKERPHONE

WITH LCD DISPLAY

The LCD on the handset shows the channel number dialed, out-of-range-alert, call duration and more! There's also 10-channel remote change with autoscanning which automatically scans for a clear channel while in the standby mode or in the base unit! Now only...

ORIGINALLY $\$149^{95}$

MODEL
KX-T3860
#1828496

$\$99^{95}$

AVAILABLE IN BLACK OR WHITE

Panasonic

THE WORLD'S BEST CORDLESS TELEPHONE PANASONIC 900MHz

It's simply Incredible! Take this phone down the street to your neighbors for a barbeque and you will think you were calling from your own backyard! But that's not all! It's also the ultimate cordless phone for small businesses that can't afford to have anything interfere with an important call! Besides the advantages of mobility and clarity, this model has an impressive list of features including, intercom with 2-way paging, 30 channel auto scanning, auto speed dialer, private digital security and much much more! Now only...

MODEL
KX-T9020
#1855399

$299

10 CHANNEL PHONES /ANSWERING MACHINES

Panasonic

10 CHANNEL CORDLESS SPEAKERPHONE

w/ANSWERING MACHINE

This cordless answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are, 2- way paging, intercom, auto security system, message alert, 2-way and memo recording just to name a few. Now only...

MODEL
KX-T 4330
#1796483

$\$137^{45}$

AVAILABLE IN BLACK OR WHITE

Panasonic

10 CHANNEL CORDLESS SPEAKERPHONE

w/ANSWERING MACHINE AND TIME/DAY STAMP

With speakerphone, time/day stamp, 2-way page, intercom, an auto security system, message alert, 2-way and memo recording, time check, 2 message greetings, and much more, this Panasonic cordless speakerphone with micro cassette answering machine is an excellent value at only.....

MODEL
KX-T4370
#1796494

$\$179^{95}$

Panasonic

10 CHANNEL CORDLESS SPEAKERPHONE

w/DUAL MICROCASSETTE

This new top of the line cordless dual microcassette answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are: 2-way paging, intercom, auto security system, message alert, 2-way and memo recording just to name a few. Now only...

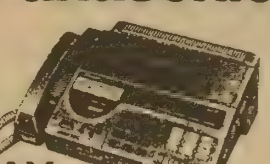
MODEL
KX-T4400
#1735370

$\$199^{95}$

AVAILABLE IN BLACK OR WHITE

FAX MACHINES

Panasonic



FAX MACHINE

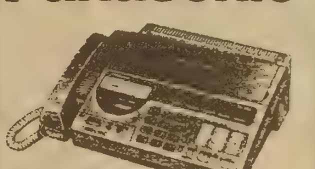
WITH ANSWERING MACHINE AND ANTI-CURL

This fully featured Fax from Panasonic comes equipped with an auto-logic answering system and anti-curl, as well as copier capabilities. It's the perfect secretary for your home or business!

MODEL
KX-F150
#1770001

$389

Panasonic



FAX MACHINE

WITH PAPER CUTTER AND ANTI-CURL

This fully featured Fax from Panasonic comes equipped with an auto-logic answering system and auto paper cutter, as well as copier capabilities. It's the perfect secretary for your home or business!

MODEL
KX-F250
#1770023

$459

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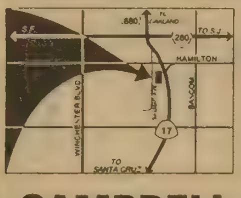

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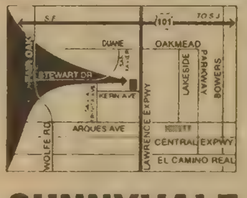

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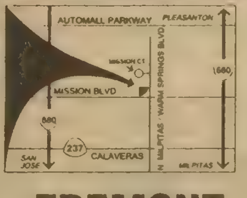

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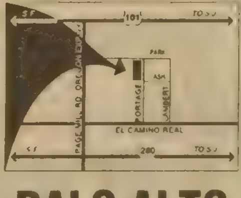

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ELECTRONIC DATA MANAGEMENT FOR EVERY NEED

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CASIO
32KB DATA BANK

Perfect for the business person on the go, this compact data bank incorporates a 16 x 4 line display with a daily alarm, schedule alarm, calendar display, memo function, 6 currency conversion memories, and a clock with world time function (29 different time zones including 27 cities) all for only...

$39.99

MODEL SF-A10
#1728462

CASIO
B.O.S.S.
WITH 64KB MEMORY

This business organizer scheduling system comes packed with powerful functions that are practical and easy to use. The QWERTY Keyboard, telephone directory, calendar, memo function, schedule alarm, world time function, home time function, and schedule keeper will prove to be an invaluable tool in keeping your busy days in order. An excellent investment at...

$79.95

MODEL SF-5300
#1671137

CASIO
64K ORGANIZER
W/BUILT IN SPREADSHEET

Designed for the person on the go! This executive B.O.S.S features a built-in lucid 3-D spreadsheet program that accepts Lotus 1-2-3 files plus an **extra 64k** for your spreadsheet files with a business card library that stores 384 characters per entry, which is enough room to record name, title, company, address, phone number, fax number, and more. Its telephone directory, schedule keeper with alarms, calendar, and PC link capability make this Casio Organizer perfect for anyone with a busy schedule at just...

$129.95

MODEL SF-8500
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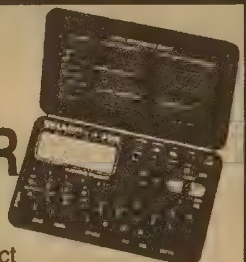


SHARP
PERSONAL ORGANIZER

Perfect for the business person on-the-go, this compact data bank incorporates a 14 x 3 line display, built-in calendar, schedule, phone/memo, memo pad, expense, clock, anniversary, and calendar functions as well as QWERTY keyboard to simplify data entry. Once you've used this electronic marvel, you won't leave your home or office without it!

$39.99

MODEL YO-100
#1800665

SHARP
128KB BUSINESS ORGANIZER
w/WIDE SCREEN DISPLAY

In today's world, it's sometimes hard to keep track of where you've been, who you've seen, and where you're going, but now it's as easy as saying "S.H.A.R.P!" With this deluxe business organizer, you can store approximately 2,470 names and numbers or 1,740 schedule appointments (128K), but that's just the beginning, the unit's internal memory can be allocated between 10 major built-in functions: An integrated schedule and to-do list with 3 different calendar views, 3 phone/address books, business card file, memo pad, outliner, home and world time clocks, and a calculator. You can send/receive electronic mail using built-in terminal emulation software and an optional PC modem, as well as, exchange data with your PC or Mac using an optional PC interface software and cable package. A must for any business person on-the-go at only...

$189.95

MODEL YO-610
#1753444

SHARP
512K PERSONAL ORGANIZER
w/TOUCH SCREEN TECHNOLOGY

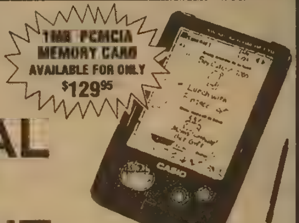
This Sharp Wizard lets you leave your portable computer at home but puts the power of that computer in your pocket! Here's a small sampling of the innovative features. Touch screen technology which allows you to write or draw on the screen using the Wizard pen, filer which organizes related data into folders that can be transferred to another touch screen Wizard via infared, and a true word processer with a large screen display and a keyboard that's 75% the size of a standard PC keyboard. The possibilities are endless at only...

$449

MODEL OZ-9600 II
#1797152

PDAs

CASIO



1MB PCMCIA MEMORY CARD AVAILABLE FOR ONLY $129.95

PERSONAL DIGITAL ASSISTANT
DOS COMPATIBLE W/GEOS OPERATING SYSTEM

Now an amazing device, no bigger than a small paperback book, can store your hand written notes and sketches, arrange your calendar, keep track of hundreds of phone numbers and addresses, help organize your personal finances, perform complex mathematical calculations, give you easy access to electronic mail and a host of sophisticated on-line information services. With up to 100 hours of operation from 3AA Alkaline batteries, and S-RAM or Flash card compatibility, the versatility and performance of this PDA is unmatched at only...

PRICE BREAK

$599

MODEL Z-7000
#1815308

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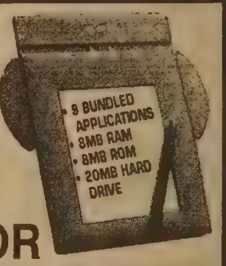

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- 8MB RAM
- 8MB ROM
- 20MB HARD DRIVE

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"The First Truly Handheld Mobile Office"

The AT&T EO Personal Communicator is the most revolutionary advancement in Communication Technology to appear in years. By combining Faxing capability (by either Phone Line using the built-in modem, or wireless using an optional cellular module), E-Mail, Data Access, and Pen-Based computing in a single 2.2 LB Handheld Unit, the AT&T EO Personal communicator is what you need today to stay ahead in business. A COMPLETE mobile solution. A solution that keeps you in touch anytime and anywhere!

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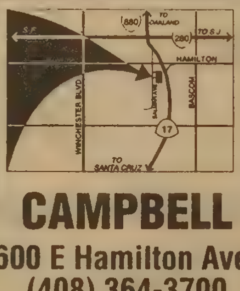

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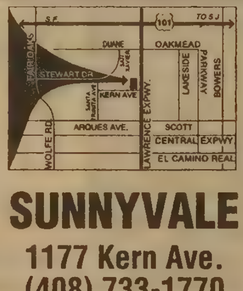

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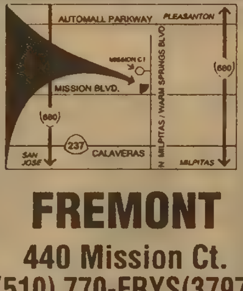

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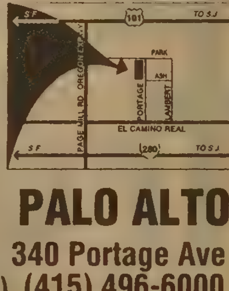

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THE BEST HOME OFFICE SELECTION IN NORTHERN CALIFORNIA!

ALL DIGITAL ANSWERING MACHINES

AT&T

ALL DIGITAL ANSWERING MACHINE

This AT&T answering system utilizes tapeless digital technology to ensure consistent recording quality over the life of the system. The convenience of new message playback, outgoing message bypass, remote system turn on or off and remote message recording makes this an excellent value at only...

$69.95

MODEL 1710
#1853906

GENERAL ELECTRIC
GE We bring good things to life

ALL DIGITAL ANSWERING MACHINE W/THREE MAIL BOXES

With three mailboxes to choose from, members of the house hold can have messages stored for them in their own mailbox! The all digital capability eliminates the need for moving parts and allows for instant playback of incoming messages-no need to wait for a tape to rewind or fast forward! Other features include voice time/day stamp, two outgoing messages, digital counter, selective message erase and much more for only...

$89.95

MODEL 2-9876
#1839261

SONY.

ALL DIGITAL ANSWERING MACHINE W/ VARIABLE SPEED MESSAGE PLAYBACK

Sony has taken digital technology to a new dimension with this beautifully-designed, all digital answering system. The variable-speed message playback controller allows you to speed up (to 1.6 times speed) or slow down (to 0.7 speed) playback of messages without changing pitch. In addition, you can skip, repeat or backspace messages. The multi-function LCD display functions as a digital message counter, clock, call timer, answer mode indicator, and back-up battery strength indicator, while the voice time/day stamp automatically records the time of the message receipt after each message Other features include: Voice-guided operation, Pre-recorded greeting, Announce-only mode, Memory usage guage, Audible message alert, Remote on/off, Auto interrupt, Memo recording, 2-way conversation recording, and Adjustable ring delay. An invaluable addition to any home or office at only...

$129.95

MODEL
TAM-1000
#1803901

AT&T

ALL DIGITAL ANSWERING SYSTEM SPEAKERPHONE w/4 VOICE MAILBOXES • 26 MINUTE TOTAL CAPACITY

AT&T's Tapeless digital technology ensures instant access and consistent recording quality The individual voice mailbox system incorporated into this unit allows callers to leave separate messages for up to 4 people. Each of these voice mailboxes allows for a personal outgoing announcement. By utilizing the selective save and delete functions you can save the entire message or only the parts you need, and easy to follow prompts will direct you through a menu of remote commands when calling from a touch tone or rotary telephone. Other features include voice/time stamp, handset play back and record, display screen indicating time, day, and number dialed, audible message alert, priority calling, memo, and 2-way call recording. An invaluable addition to any home office at...

$199.95

MODEL
1545
#1771677

MULTI-LINE BUSINESS PHONES

GENERAL ELECTRIC
GE We bring good things to life

TWO-LINE TELEPHONE

This ingenious telephone uses dual ringers with distinct ringer sounds and seperate ringer controls for each line! By pressing the conference button you will be able to conduct a three way conversation. An excellent value at only...

$39.95

MODEL 2-9420
#1674288

AT&T

TWO LINE SPEAKERPHONE

AT&T delivers with this feature packed two-line speakerphone. The distinctive ringing feature will help distinguish which line is ringing, and 3-party conferencing allows you to bring calls from 2 phone lines together for 3-way conversations. An excellent value at...

$79.95

MODEL 722
#1548433

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FOUR LINE SPEAKERPHONE

This deluxe four-line speakerphone is capable of handling up to four lines with a maximum of 16 stations. Its convenient 32 number one-touch telephone memory, along with all station page, intercom, call transfer, busy redial, flash and much more make this the perfect addition to any home or office at just......

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MODEL 2-9450
#1768637

AT&T

THREE LINE SPEAKERPHONE

AT&T's multi-functional centrex compatible 3-line speakerphone comes equipped with page, intercom, 3-way conferencing, LCD display, 40 number memory, auto line selection, hold, do not disturb function, auto-redial, mute, programmable pause, call transfer, flash, seperate ringer controls and more, all for only......

$179.95

MODEL 843
#1853892

900 MHz CORDLESS PHONES

20 CHANNEL 900MHz CORDLESS PHONE

From VTech a leader in 900MHz cordless phone technology come this feature packed unit with 20 channel selection, a digital voice encryption system, out-of-range indicator, four programmable ringer types, one-way page, 10 number memory, mute, flash, hold, and last number redial all for the incredible price of only....

$189.95

MODEL 900 DL
#1818666

AT&T

DIGITAL 900MHz CORDLESS PHONE

AT&T, the leader in digital telephone technology once again leads the way into the future with the introduction of this 900MHz cordless phone. By operating at the 900MHz frequency range rather than the conventional 46 to 49MHz range, this AT&T cordless phone will provide clearer transmission with less noise and interference from other electronic devices, as well as extended range performance! Features include 10 number memory, mute, hold, flash, last number redial, on-way paging, out-of-range-indicator, digital voice encryption, and much more for only....

$249

MODEL 9100
#1802287

SONY.

40 CHANNEL 900 MHz CORDLESS SPEAKERPHONE

By combining 900MHz Enhanced Reception with a 40 Channel Auto Scan system, Sony has designed a cordless phone that not only provides clearer transmission with less noise and interference than conventional 46 to 49 MHz cordless phones, but also gives you enhanced channel selection resulting in greater flexibility if you encounter interference during a call. With 2-Way Paging/Intercom, Base Speakerphone, 3-Way Conversation, 20 number memory, last number redial, flash, and more. Sony has designed the perfect cordless phone for the home or office at only...

$297

MODEL SPP-ER1
#1839009

Panasonic

THE WORLD'S BEST CORDLESS TELEPHONE PANASONIC 900MHz

It's simply Incredible! Take this phone down the street to your neighbors for a barbeque and you will think you were calling from your own backyard! But that's not all! It's also the ultimate cordless phone for small businesses that can't afford to have anything interfere with an important call! Besides the advantages of mobility and clarity, this model has an impressive list of features including, intercom with 2-way paging, 30 channel auto scanning, auto speed dialer, private digital security and much much more! Now only...

$299

MODEL KX-T9020
#1677122

FAX MACHINES

SAMSUNG
Electronics American, Inc

COMPACT FAX MACHINE

This unbelievable value from Samsung comes equipped with a telephone answering machine interface, 10 number speed dialing, last number memory, polling, on-hook dialing, and remote operation (extension phone transfer to fax) all for only.....

$198.99

MODEL FX-40
#1820524

Panasonic

FAX MACHINE W/ANSWERING MACHINE & ANTI-CURL

This fully featured Fax from Panasonic comes equipped with an auto-logic answering system and anti-curl, as well as copier capabilities. It's the perfect secretary for your home or business!

$389

MODEL
KX-F150
#1770001

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PERSONAL FAX W/ DIGITAL MESSAGE CENTER

Compact in design. Practical in functionality. This personal fax with all digital answering machine and auto paper cutter will fit as comfortably on your desk at work as it will your kitchen counter! With two-way digital speakerphone, 5 page document feeder, 12 one-touch dialing numbers and 30 auto dial numbers, on hook dialing, polling, resolution and contrast control, transmission terminal identification, delayed transmission polling and 98' paper roll capacity, AT&T has developed the ultimate fax for the home or office at just...

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#1850866

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PLAIN PAPER FAX MACHINE W/256 KBYTES OF MEMORY

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HP-FAX900
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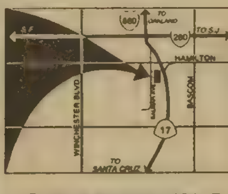

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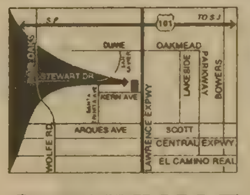

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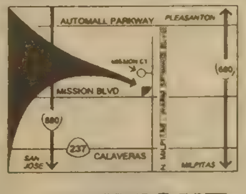

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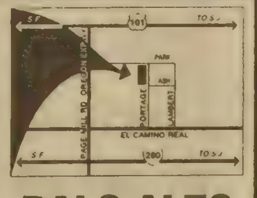

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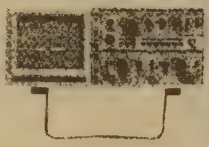

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x10 magnifier • Bright, sharp rectangular CRT with P3331 phosphor X-Y operation
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Data hold • Min/Max Average Memory Record
True Rms • Auto sleep • Power off
2 Year warranty
Model 104
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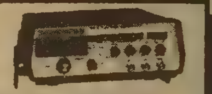

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2 MHz FUNCTION GENERATOR WITH DIGITAL DISPLAY

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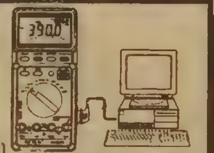

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This new meter will let you download your measurements into your PC. Come see the new Metex DMM.

M3850
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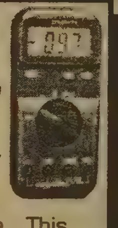

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Model 33 is a versatile digital multimeter with an impressive range of capabilities offered at an incredible price. This unit has data-hold functions and a basic accuracy of 0.5%, also audible continuity and fused 20A input.

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Model 33
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HOT!

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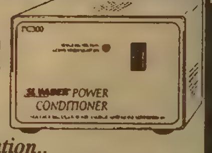

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If your equipment suffers from power problems, your company suffers too... SL Waber Has A Solution..

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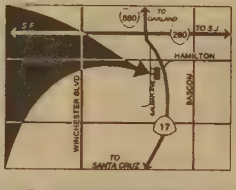

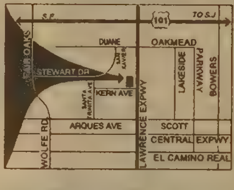

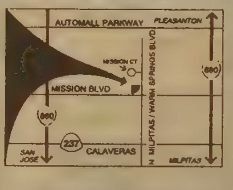

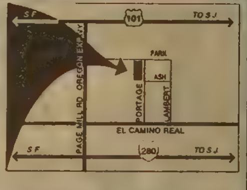

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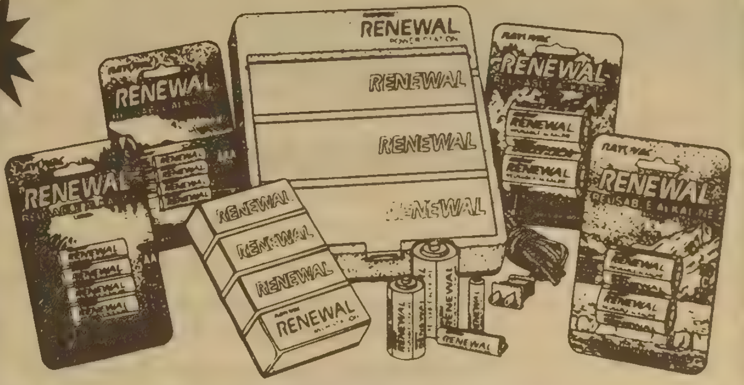

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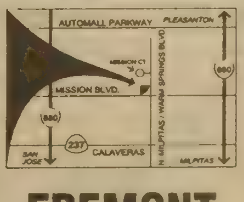

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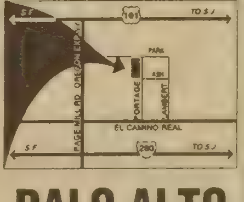

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Continued from page 162

Books

MULTIMEDIA POWER TOOLS

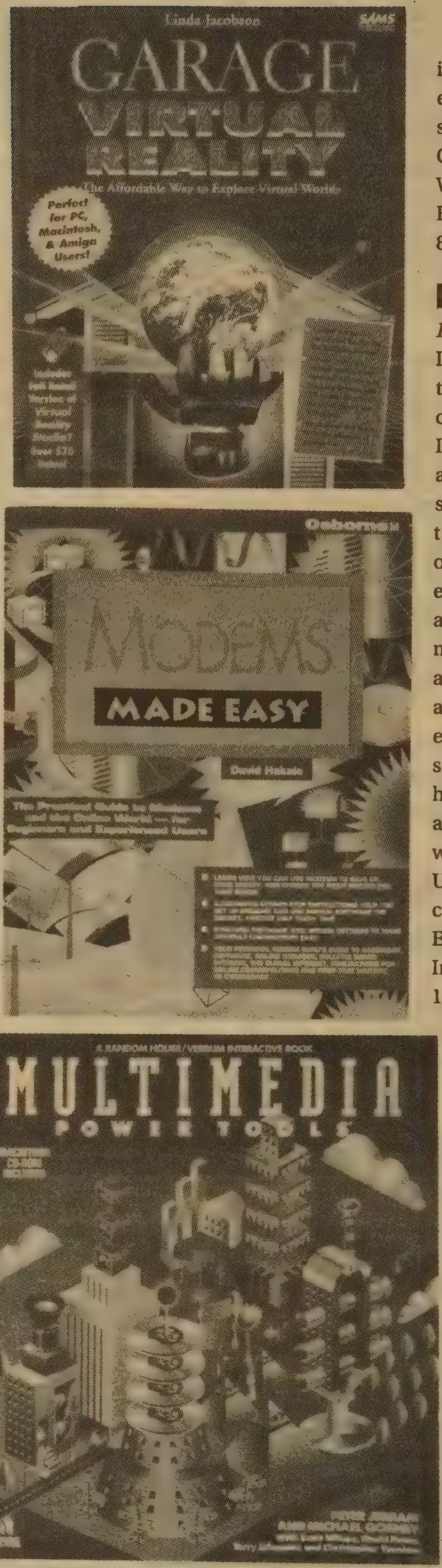
Created by multimedia experts Michael Gosney and Peter Jerram, *Multimedia Power Tools* lays bare the technology and techniques behind multimedia, so readers can make informed decisions and development strategies. The book/CD-ROM package features a system called Power Codes; when the book mentions an application, technique, or utility, it often provides a Command-key code which allows the reader to jump directly to the related files on the CD-ROM. The book includes hundreds of tips and tricks from top multimedia developers, an extensive multimedia glossary, and information on such topics as authoring tools and techniques; producing sound, animation, video, and interactivity; file formats, compression, and storage considerations; and the US copyright act. ($50) Random House Electronic Publishing, Random House, Inc., 201 E. 50th St., New York, NY 10022. 1-800-733-3000.

GARAGE VIRTUAL REALITY

In *Garage Virtual Reality*, author Linda Jacobson shows how to create a virtual reality system for multiple platforms, including IBM PCs, Macintosh, and Amiga systems. The book presents the origins and definitions, introduces the people who first started exploring garage virtual reality, and then explains what's required to explore virtual worlds yourself. The disk included with the book contains a full retail version of Virtual Reality Studio 1, special demo version of Vistapro 3, source code for developing virtual interfaces, and more. ($24.95) Sams Publishing, 201 W. 103rd St., Indianapolis, IN 46290. 1-800-428-5331.

MODEMS MADE EASY

In *Modems Made Easy*, author David Hakala gives suggestions and ideas for everything from puchasing hardware and software to accessing online services, the Internet, and cyberspace. This book provides illustrated step-by-step instructions for easy, trouble-free modem connections. Information on using Windows, fax/data modems, and optical character recognition (OCR) software is also included. For those who become enthusiasts, Hakala describes easy-to-operate BBS software so readers can set up their own bulletin board system. Other topics covered include: buying the right modem at the right price; fine-tuning and troubleshooting your modem and fax board; sending email through the major online services such as CompuServe, GEnie, and America Online; and communicating with the White House. ($16.95) Osborne/McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710. 1-800-227-0900.


Linda Jacobson
SAMS
GARAGE VIRTUAL REALITY
The Affordable Way to Explore Virtual Worlds
Perfect for PC, Macintosh, & Amiga Users!
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MULTIMEDIA POWER TOOLS

Top to bottom: *Garage Virtual Reality* by Linda Jacobson; *Modems Made Easy* by David Hakala; *Multimedia Power Tools* by Peter Jerram and Michael Gosney.

INTERNET BASICS

Internet Basics, by Walt Howe and Steve Lambert, takes readers on a simple guided tour of the Internet. Beginning with precise instructions on how to access the Internet, the authors provide a complete and concise introduction to life in cyberspace on the global electronic information highway. Topics include how to obtain free Internet access; send email; exchange information through Listserv and Usenet; transfer files with FTP; communicate with proper network etiquette; and use Internet resources such as Telnet, archie, gopher, WAIS, veronica, and others. *Internet Basics* includes free membership to Delphi Internet Services and five hours of free online time. It also provides answers to frequently asked questions, as well as country codes and appendices on UNIX basics, and Internet and Delphi commands. ($27) Random House Electronic Publishing, Random House, Inc., 201 E. 50th St., New York, NY 10022. 1-800-733-3000.

PHOTOSHOP IN BLACK AND WHITE

Photoshop isn't just for color manipulation, it has dozens of tools that enable the user to correct and enhance black-and-white photos as well. *Photoshop in Black and White*, by prepress experts Jim Rich and Sandy Bozek, is an important resource for adjusting black-and-white images using Photoshop 2.51 and earlier versions. Aimed at intermediate to advanced users running the program on either Mac or Windows, the 48-page guide distills critical concepts, methods, and techniques into an easy-to-understand format. Among the topics covered are key Photoshop tools for black-and-white imaging; step-by-step strategies for adjusting images for reproduction; how and when to adjust highlights, midtones, and shadows; scanning techniques; and calibration methods. ($18) Peachpit Press, 2414 Sixth St., Berkeley, CA 94710. 1-800-283-9444.

Continued on page 98

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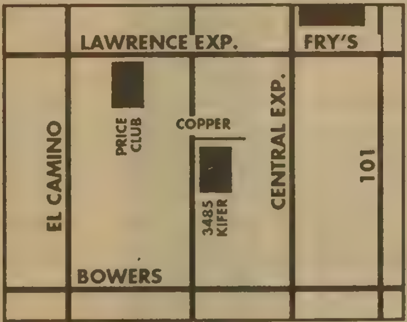

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Top: ZyXEL U-1496P Portable Modem; bottom: Hayes Optima 288 V.FC + Fax.

ZYXEL U-1496P PORTABLE MODEM

The U-1496P features autoswitch capabilities for land lines and cellular networks. Over land lines, the modem performs at up to 16,800bps for data and 14,400bps for fax transmissions. For cellular connections, it performs at up to 14,400bps while running on either AC or DC power. It is also fully compatible with V.32bis, V.42bis with selective reject, V.42, and MNP 3–5 protocols. The U-1496P features cellular faxing capabilities, remote configuration, digitized voice capability, and synchronous/asynchronous transmission modes. ($529, optional travel kit is $75) ZyXEL Corp., 4920 E. La Palma Ave., Anaheim, CA 92807. (714)693-0808.

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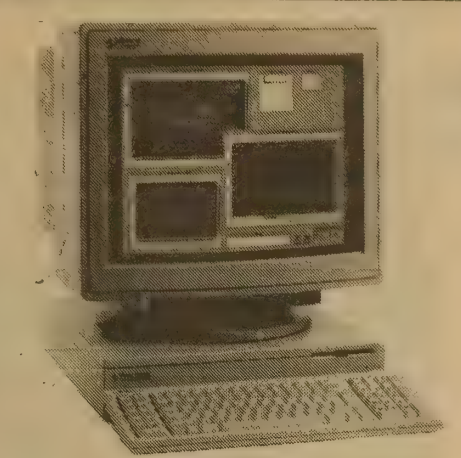

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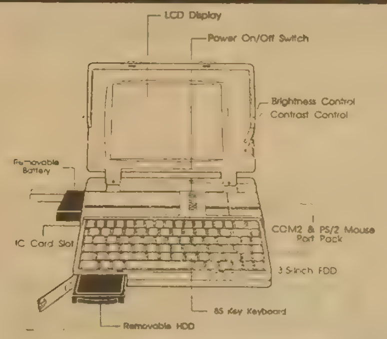

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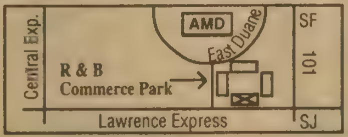

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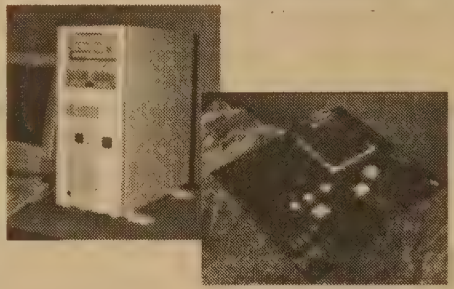

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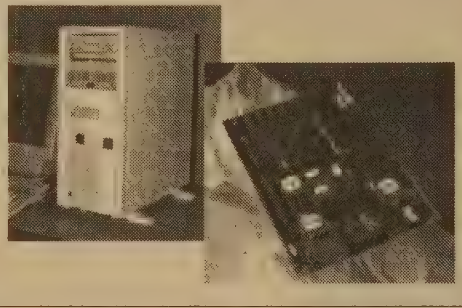

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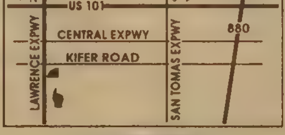

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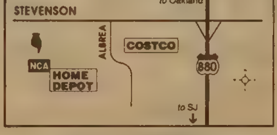

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- Intel Mercury PCI Chip Set
- 256K Direct Mapping, write back second level Cache
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- Integrated PCI IDE port
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- Heat Sink for CPU
- Mitsumi High Quality Keyboard
- 0Mb RAM up to 128MB (72Pin Simms)
- NCA's Special 9bay Tower Case
- 250W UL Power Supply

Above Pentium System with VLB (no PCI)...$1599

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Based on NCA's High Quality
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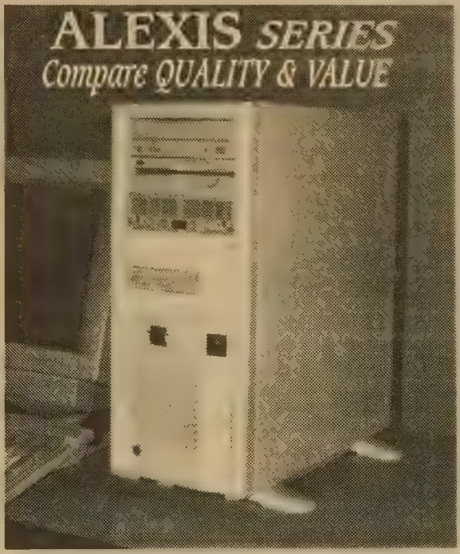
PCI-486DX33 System	$799
PCI-486DX2-50 System	$859
PCI-486DX2-66 System	$989



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Tony G.
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486SLC-2/66MHz VESA Medium Tower

- Alaris Motherboard, Manufactured by IBM
- IBM 486SLC-2/50MHz CPU
- 2 Local Bus 32-Bit Slots
- 7 16-Bit Slots, 1 8-Bit Slot
- 128K Cache
- Medium Tower with 250W UL power Supply
- TEAC Floppy Drive 1.2 or 1.44
- DTC VLB IDE Controller 2FD/2HD
- I/O: 2 serial, 1 Parallel, 1 Game
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- Clock & Calender
- 0MB RAM (up to 16MB)

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Based on NICE™ motherboard

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- 0MB up to 128MB (30-Pin Simms)
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- MED Tower 250W UL Special Case
- TEAC 1.44 or 1.2
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- 256K Cache upto 1MB

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- 128K Cache (to 256K)
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- 101 Mitsumi Keyboard
- DTC VLB IDE Controller 2FD/2HD
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- 1 Year Warranty on Parts & Labor

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Alexis 455VL

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Alexis 466VL

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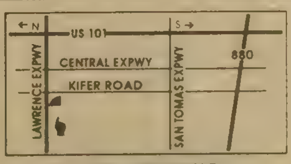

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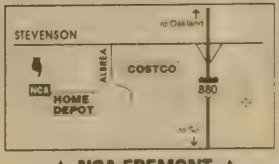

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13ms, CPF3340A

540MB IDE............$449
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SCSI

1.37GB SCSI-II....$914
- 3.5"X1" LOW PROFILE
- 9ms, CP31370

EXTERNAL...$1024

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
340MB	CP3340	X	X	3.5X1"	$319	$429
540MB	CP30540	256K	12ms	3.5X1"	$494	$614
1.0GB	CPF1060S	256K	<10ms	3.5X1"	$949	$1059
1.37GB	CP31370	X	9ms	3.5X1"	$914	$1024

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5-year factory warranty

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3.5"
12MS
MODEL#MK438FB
5-Yr. Warr.

$639

External $749

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13MS. MODEL#WD2250, 2Yr. Warr.

340MB IDE $255
12MS. MODEL#WD2340, 3Yr. Warr.

420MB IDE $338
13MS. MODEL#WD2420, 3Yr. Warr.

540MB IDE NEW! $459
12MS. MODEL#WD2540, 3Yr. Warr.

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2.0GB SCSI-II

- DSP-5200S
- 3600RPM
- 12.5ms
- Full Height
- 5-Yr. Warr.

$1179

External..............................$1399

Fast SCSI-II

CAPACITY	M/N	CACHE	RPM	SPEED	INTERNAL	EXTERNAL
1.0GB	3107L	3.5"X1"	5400	9ms	$999	$1129
1.6GB	**3160S**	**3.5"**	**5400**	**9.5ms**	**$1249**	**$1359**
2.1GB	**3210S**	**3.5"**	**5400**	**9.5ms**	**$1639**	**$1749**
2.0GB	**5200S**	**FH**	**3600**	**12.5ms**	**$1199**	**$1399**
3.5GB	5350S	FH	5400	11.5ms	$2699	$2899

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4GB Fast SCSI-II

5.25" Format: Contains Two 3.5" HDAs Addressable as one LUN

- Data Stripping Across Two Actuators
- 1MB Multi-Segmented, Dual Port Data Buffer
- <10ms Read Access Time
- 5400RPM
- Up to 20MB/Sec Transfer Rate (sync)
- 375,000 hous MTBF
- 5Yr. Warr.

$3699

1.0GB FAST SCSI-II LOW PROFILE 3.5"X1"

- 800,000 Hrs. MTBF
- 8.6ms Access Time
- 5400 RPM
- 512K Cache
- 5Yr. Warr.

INTERNAL **$1059**

External $1169

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131MBIDE..................$179
7131A, 14ms, 1 Yr. Warr.

245MBIDE..................$239
7245A, 15ms, 1 Yr. Warr.

345MBIDE..................$279
7345A, 14ms, 2 Yr. Warr.

540MBIDE.....$439
MXT-540A, 8.5ms, 256K Cache, 2 Yr. Warr.

SCSI

External SCSI Drives Add $110

245MBSCSI..............$239
7245S, 15ms, 2 Yr. Warr.

345MBSCSI..............$337
7345S, 14ms, 2 Yr. Warr.

540MBSCSI...$569
MXT-540S, 8.5ms, 256K Cache, 2 Yr. Warr.

1.2GBSCSI.............$1299
MXT-1240S, 8.5ms, 256K Cache, 2 Yr. Warr.

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- Power Cable & Hardware
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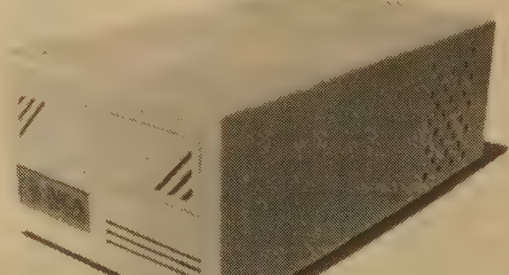

See page 6 for a complete list of External Hard Drives, CD-ROM Drives, Tape Backup Drive...

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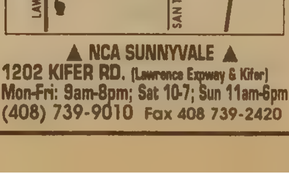

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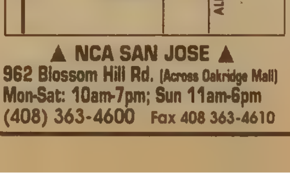

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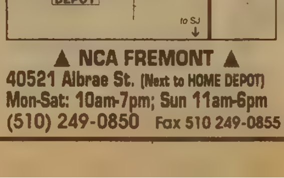

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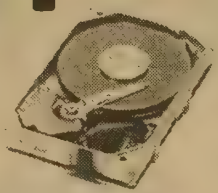

270MB IDE $229

LPS270A, 12ms, 128K Cache, 3.5X1"

540MB IDE $449

LPS540AT, 12ms, 128K Cache, 3.5X1"

1.8GB SCSI 3.5" $1149

PD1800S, 10ms, 512K Cache, 3.5

EXTERNAL $1259

BRAND NEW WITH A TWO YEAR FACTORY WARRANTY - FIVE YEARS ON PD SERIES ONE YEAR ON 2.5" DRIVES

IDE

FOR NOTEBOOKS

CAPACITY	M/N		SPEED	SIZE	PRICE
127MB	GLS127AT		17ms	2.5"X17mm	$249
170MB	GLS170AT		17ms	2.5"X17mm	$279
256MB	GLS256AT		17ms	2.5"X19mm	$369
127MB	ELS127A	32K	17ms	3.5X1"	$179
170MB	ELS170A	32K	17ms	3.5X1"	$189
240MB	LPS240A	256K	16ms	3.5X1"	$229
270MB	**LPS270A**	**128K**	**12ms**	**3.5X1"**	**$229**
340MB	**LPS340A**	**128K**	**Fast**	**3.5X1"**	**$265**
525MB	LPS525AT	512K	10ms	3.5X1"	$499
540MB	**LPS540AT**	**128K**	**12ms**	**3.5X1"**	**$449**

SCSI

FOR MAC POWERBOOKS

CAPACITY	M/N	SPEED	SIZE	PRICE
127MB	GLS127S	17ms	2.5"X17mm	$269
170MB	GLS170S	17ms	2.5"X17mm	$289
256MB	GLS256S	17ms	2.5"X19mm	$379

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
127MB	ELS127S	32K	17ms	3.5X1"	$189	$309
170MB	ELS170S	32K	17ms	3.5X1"	$199	$329
240MB	LPS240S	256K	16ms	3.5X1"	$249	$359
270MB	LPS270S	128K	12ms	3.5X1"	$269	$379
525MB	LPS525	512K	10ms	3.5"X1"	$499	$609
540MB	LPS540S	128K	10ms	3.5"X1"	$569	$689
700MB	PD700	512K	10ms	3.5"	$739	$859
1.0GB	PD1050S	512K	10ms	3.5"	$869	$979
1.2GB	PD1225S	512K	10ms	3.5"	$939	$1049
1.8GB	**PD1800S**	**512K**	**10ms**	**3.5"**	**$1149**	**$1259**

▶ FACTORY NEW WITH FULL FACTORY WARRANTY

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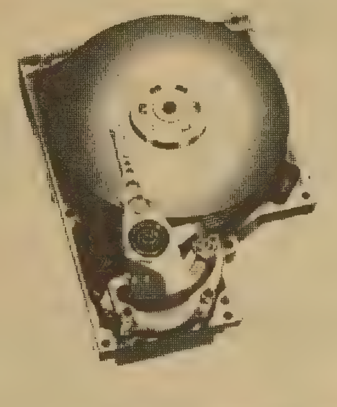
SUPER DEAL:

1.0GB FAST SCSI 3.5X1" LOW PROFILE $849

ST31200N, 5 Yr warr. 9ms, 256K Cache

EXTERNAL... $959

BARRACUDA SERIES



BARRACUDA I / 1.6GB

ST11950N

- ▶ 3.5", 8ms
- ▶ 7200RPM
- ▶ Fast SCSI-II
- ▶ 500,000MTBF

INTERNAL $1599

EXTERNAL $1739

BARRACUDA II / 2.1GB

ST12550N

- ▶ 3.5", 8ms
- ▶ 7200RPM
- ▶ Fast SCSI-II
- ▶ 500,000MTBF

INTERNAL $1899

EXTERNAL $2059

IDE

CAPACITY	M/N	CACHE	SPEED	SIZE	PRICE
214MB	ST3243A	32K	16ms	3.5"X1"	$198
263MB	ST3290A	64K	16ms	3.5X1"	$239
341MB	ST3390A	256K	12ms	3.5X1"	$298
452MB	ST3550A	256K	12ms	3.5X1"	$449

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
343MB	ST3390N	256K	12ms	3.5"x1"	$399	$529
456MB	ST3550N	256K	12ms	3.5X1"	$529	$639
525MB	ST3600N	256K	10.5ms	3.5X1"	$679	$799
1.05GB	ST11200N	256K	10.5ms	3.5"	$849	$949
1.0GB	**ST31200N**	**256K**	**9ms**	**3.5"x1"**	**$849**	**$949**
1.4GB	ST41651N	256K	15ms	FH	$1099	$1299
1.6GB	ST11950N	256K	8ms	3.5"	$1599	$1739
1.9GB	ST42100N	256K	12.9ms	FH	$1489	$1689
2.1GB	ST42400N	256K	11ms	FH	$1699	$1899
2.1GB	**ST12400N**	**256K**	**9ms**	**3.5"**	**$1599**	**$1729**
2.1GB	ST12550N	256K	8ms	3.5"	$1899	$2059
2.9GB	ST43400N	512K	10ms	FH	$2199	$2399
2.9GB	ST43401N	512K Fast-Wide SCSI-II		5.25	$2499	$2899

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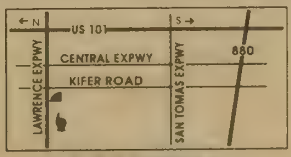

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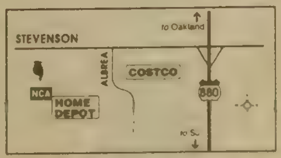

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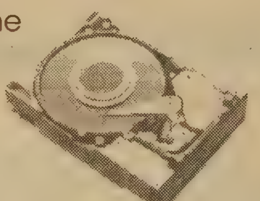
- ▶ 3.5"

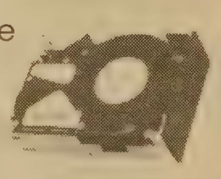


$829

EXTERNAL...$939

1.75GB 3.5" FAST SCSI-II

- ▶ MC2217S
- ▶ 10ms Seek Time
- ▶ 5400RPM
- ▶ 3.5"



$1199

EXTERNAL...$1309

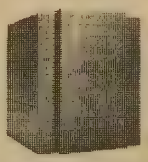
IDE

	MODEL	RPM	SPEED	SIZE	INTERNAL
1.0GB	MC2210A	5400	10ms	3.5"	........$829
1.75GB	MC2217A	5400	10ms	3.5"	......$1199

SCSI

	MODEL	RPM	SPEED	SIZE	INTERNAL	EXTERNAL
1.0GB	MC2210	5400	10ms	3.5"	......$829	........$939
1.0GB	MC2210AV	Audio/Visual			.........$999	......$1109
1.4GB	MC1908	5400	11ms	FH	......$1249	.....$1449
1.75GB	MC2217	5400	10ms	3.5"	.....$1199	.....$1309
1.75GB	MC2217AV	Audio/Visual			........$1299	.....$1409
1.8GB	MC1548	3600	14ms	FH	......$1499	.....$1699
2.0GB	MC1926	5400	11ms	FH	......$1599	.....$1799
3.0GB	MC1936	5400	11ms	FH	......$2399	.....$2599

RAIDION™



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RAID Level 5 Disk Subsystems

Includes: NOVELL or OS/2 Configuration Kits

LT1120	Lite 3X560MB Modules	..............................$Call
LT2100	Lite 3X2.1GB Modules	..............................$Call

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5 YEAR WARRANTY

520MB SCSI 3.5"

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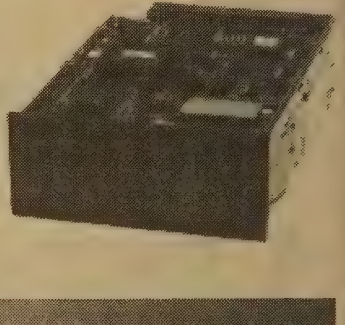
M2624FA

- ▶ 3.5" HH Drive
- ▶ 12ms Seek Time
- ▶ 240K Read/Write Cache(SCSI)
- ▶ 5-Year Warranty



$459

IDE

CAPACITY	M/N	CACHE	SPEED	SIZE	PRICE
520MB	M2624T	64K	12ms	3.5"	......$449

SCSI

CAPACITY	M/N	CACHE	SPEED	SIZE	INTERNAL	EXTERNAL
520MB	M2624FA	240K	12ms	3.5"	.....$459	......$564
1.0GB	M2694ESA	256K	10ms	3.5"	.....$839	......$949
2.0GB	**M2654SA**	**256K**	**12ms**	**FH**	**.....$1399**	**...$1599**

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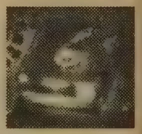
High Quality Hard Drives

1.05GB 3.5" SCSI-II

Formatted Capacity

- ▶ HP C2247
- ▶ 10.5ms Seek Time
- ▶ 5400RPM
- ▶ 300,000 MTBF
- ▶ 5-Yr. Warr.
- ▶ Up to 24 Mbits/s Trans. Rate
- ▶ Up to 10 Mbytes/s Trans. Rate (synchronous)



EXTERNAL.....$1049 **$939**

2.1GB 3.5" FAST SCSI-II

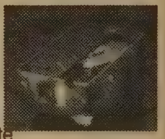
- ▶ HP C2490
- ▶ 8.9ms Seek Time
- ▶ 6400RPM
- ▶ 500,000RPM
- ▶ 5-Yr. Warr.
- ▶ 57 Mbits/s Trans. Rate
- ▶ Up to 10Megabytes/s (synchronous)

EXTERNAL.....$2229 **$2099**

2.47GB FAST SCSI-II

Unformatted Capacity

- ▶ HP C3010
- ▶ 11.5ms Seek Time
- ▶ 5400RPM
- ▶ 300,000 MTBF
- ▶ 5-Yr. Warr.
- ▶ Up to 24 Mbits/s Trans. Rate
- ▶ Up to 10 Mbytes/s Trans. Rate (synchronous)



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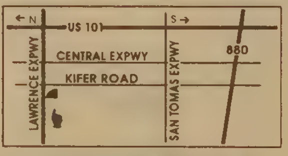

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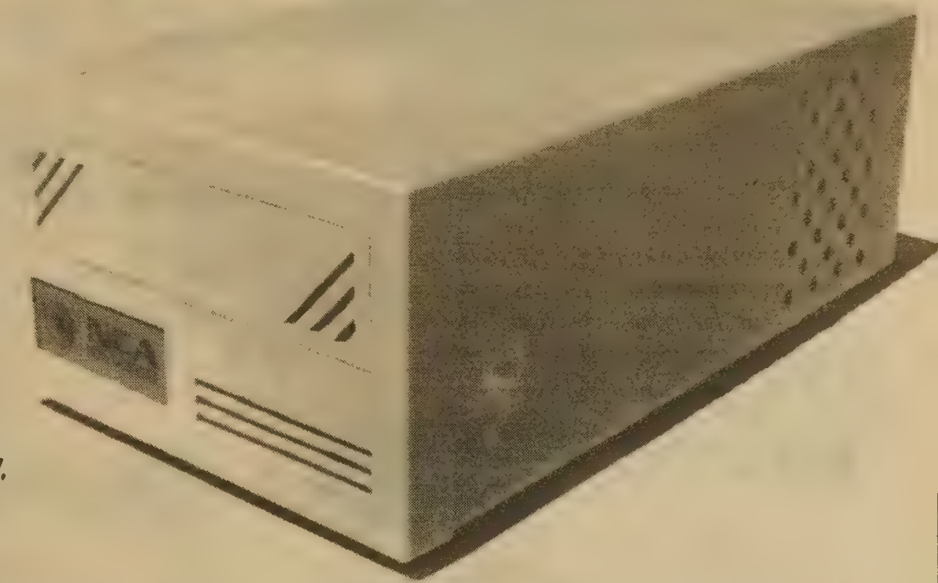

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270MB	Quantum	12ms	2Yr	$379
245Mb	Maxtor	15ms	2Yr	$349
345Mb	Maxtor	15ms	2Yr	$447
456Mb	Seagate	10ms	1Yr	$679
520Mb	Fujitsu	12ms	5Yr	$564
525Mb	Quantum	10ms	2Yr	$669
525Mb	Seagate	10ms	1Yr	$799
540Mb	Maxtor	8.5ms	2Yr	$639
540Mb	Conner	12ms	1Yr	$614
700Mb	Quantum	fast	5Yr	$859
877Mb	Toshiba	12ms	5Yr	$749
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1.0Gb	Micropolis	10ms	5Yr	$939
1.0Gb	IBM	8ms	5Yr	$1169
1.0Gb	Seagate	10ms	5Yr	$1029
1.0Gb	HP	10ms	5Yr	$1049
1.0Gb	DEC 3107	9ms	5Yr	$1129
1.0Gb	Fujitsu	10ms	5Yr	$949
1.2Gb	Quantum	10ms	5Yr	$1079
1.2Gb	Maxtor	8.5ms	3Yr	$1409
1.37Gb	Conner	10ms	1Yr	$1024
1.6Gb	DEC	9ms	5Yr	$1359
1.7Gb	Micropolis	10ms	5Yr	$1309
2.1Gb	Seagate	9ms	5Yr	$1729
2.1Gb	HP	8.9ms	5Yr	$2229
2.1Gb	DEC	9ms	5Yr	$1749

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Barracuda II

External
FH Fixed SCSI Disk Drives

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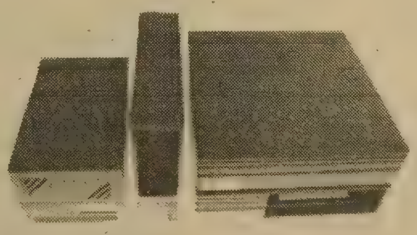
1.4Gb	Seagate	15ms	1Yr	$1299
1.8Gb	Micropolis	14ms	5Yr	$1699
1.9Gb	Seagate	12.9ms	5Yr	$1689
2.1Gb	Seagate	11ms	5Yr	$1899
2.0Gb	Micropolis	11ms	5Yr	$1799
2.0Gb	Fujitsu	12ms	5Yr	$1599
2.0Gb	HP	11.5ms	5Yr	$1899
2.0Gb	**DEC**	**12ms**	**5Yr**	**$1399**
3.0Gb	Micropolis	11ms	5Yr	$2599
2.9Gb	Seagate	11ms	5Yr	$2399
2.9Gb	Seagate	Fast Wdie	5Yr.	$2699
3.5Gb	DEC	11.5ms	5Yr	$2899
4.0Gb	IBM	11ms	5Yr	$3899



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8.0Gb	HP	35480	4mm	$1199
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8.0Gb	WangDat	3200	4mm	$1199
4.0Gb	WangDat	3300Dx	4mm	$Call
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NEC	3Xe	190ms	450Kb	$569
CHINON	535	280ms	300Kb	$429
Plextor	5028	265ms	300Kb	$379
PIONEER	604X	300ms	612Kb	$1179
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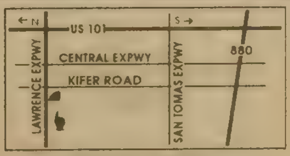

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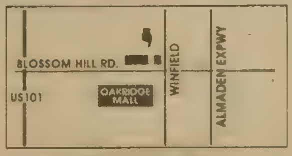

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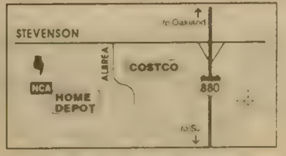

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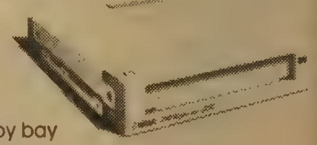

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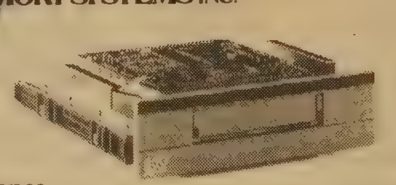

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SCSI 4mm DAT

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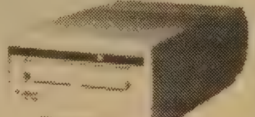

PARALLEL PRINTER PORT EXTERNAL TAPE BACK-UP SYSTEMS

RUNS OFF PARALLEL PRINTER PORT

CAPACITY	MODEL/TYPE	EXTERNAL
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250MB	**TRAKKER 250**	**$327**

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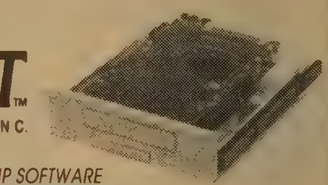

WITH CENTRAL POINT BACKUP SOFTWARE

RUNS OFF FLOPPY PORT

CAPACITY	MODEL/TYPE	INTERNAL
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250MB	SE-250	$159

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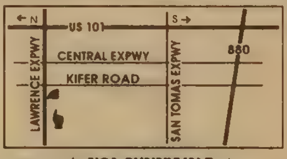

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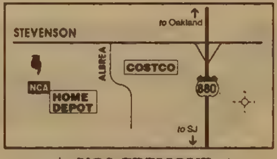

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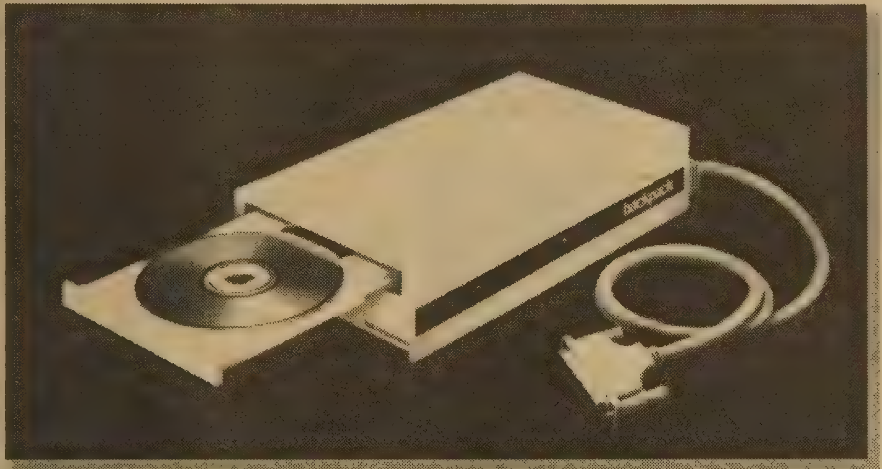

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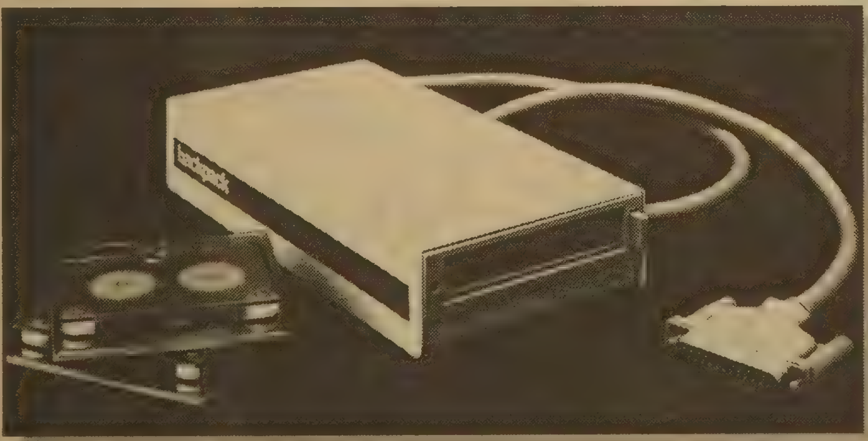

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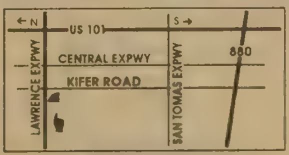

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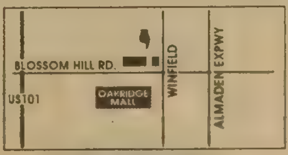

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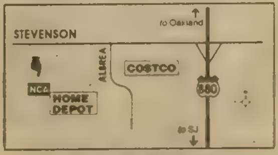

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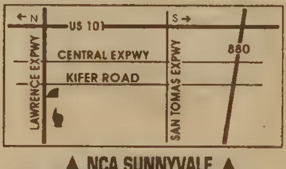

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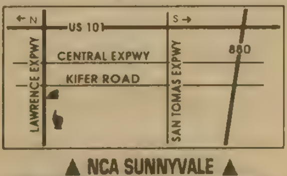

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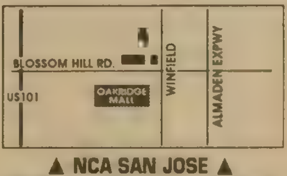

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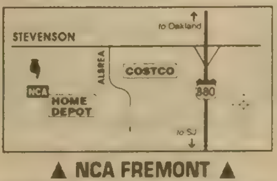

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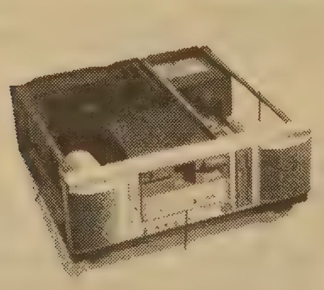

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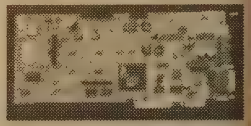

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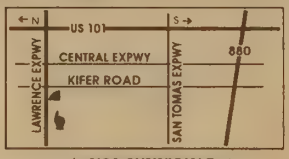

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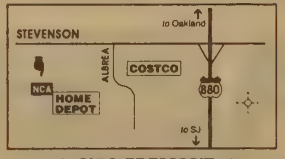

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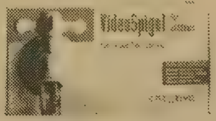

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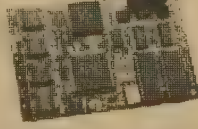

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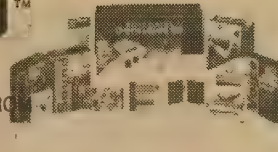

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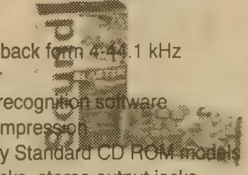

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- Real-time, 16-bit compression and decompression
- Built-in power amplifier
- Microphone, stereo line-in and CD-audio jacks, stereo output jack
- Joystick Port/MIDI interface
- Microphone included
- Bundled Software: The software Toolworks Multimedia Encyclopedia on CD-ROM, HSC InterActive SE, PC Animate Plus and Monologue for Windows.

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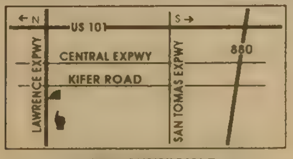

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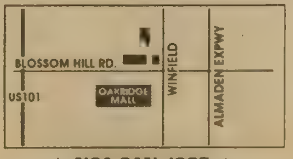

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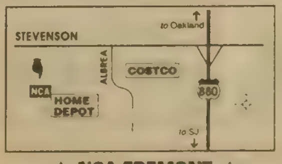

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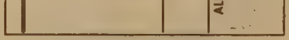

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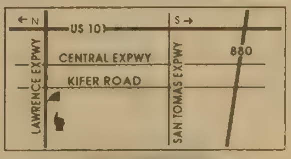

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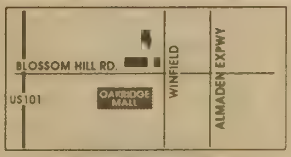

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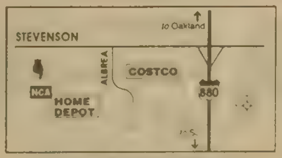

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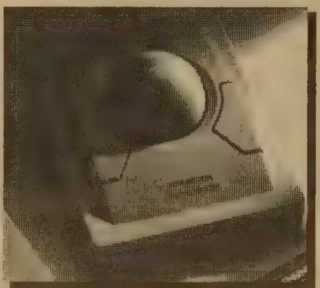

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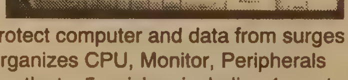

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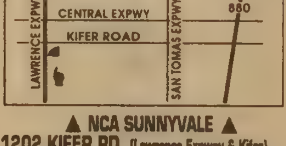

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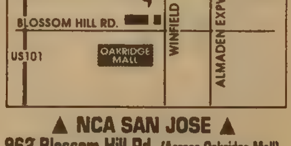

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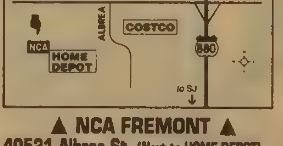

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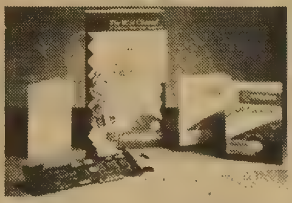

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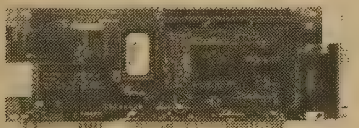

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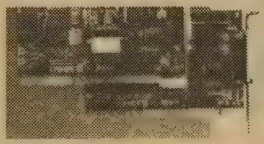

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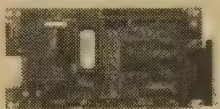

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TMC850	8-BIT W/BIOS	$59
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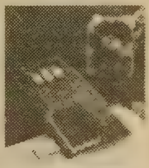

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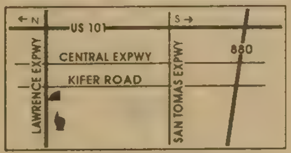

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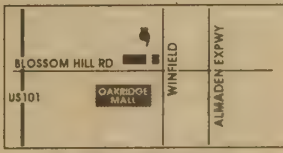

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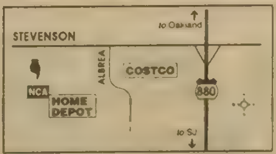

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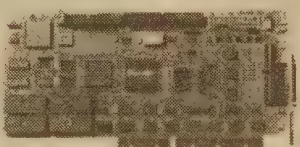

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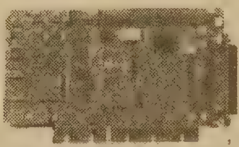

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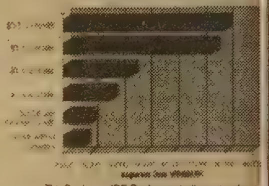

The BusLogic IDE Cache controller outperforms standard IDE systems by up to 350%

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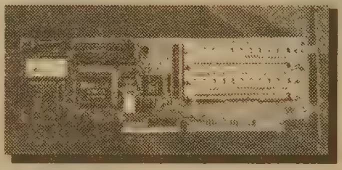

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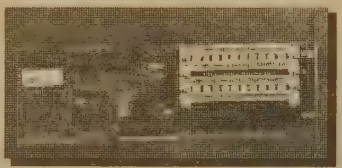

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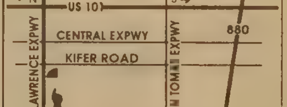

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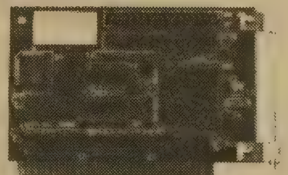

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)ouble the speed of 250MB (QIC-80) tape drive
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Supports "Media-Sensing" capabilites of 2.88MB floppies
Supports 14 different types of floppy drives including

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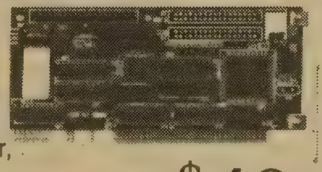
6- Primary or Secondary IDE Accelerator Board



16-Bit Accelerated IDE Channel (two IDE devices)
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Compatible with Windows 3.x, OS/2 2.x & DOS
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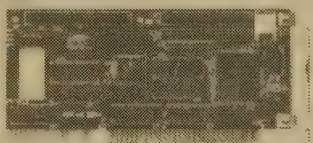
6-Bit IDE, Floppy & 250MB Tape Accelerator Board



6-Bit Accelerated IDE Channel (two IDE devices)
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One Bi-derectional Parallel Port

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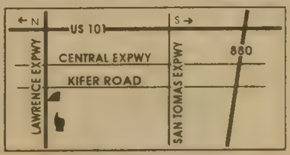

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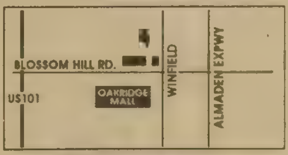

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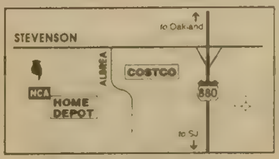

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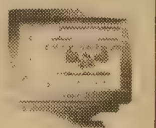

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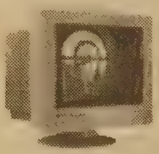

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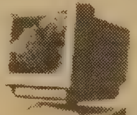

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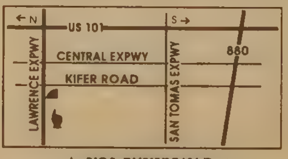

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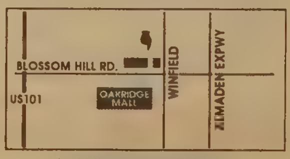

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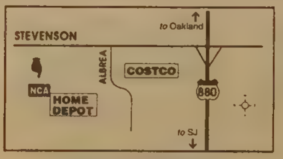

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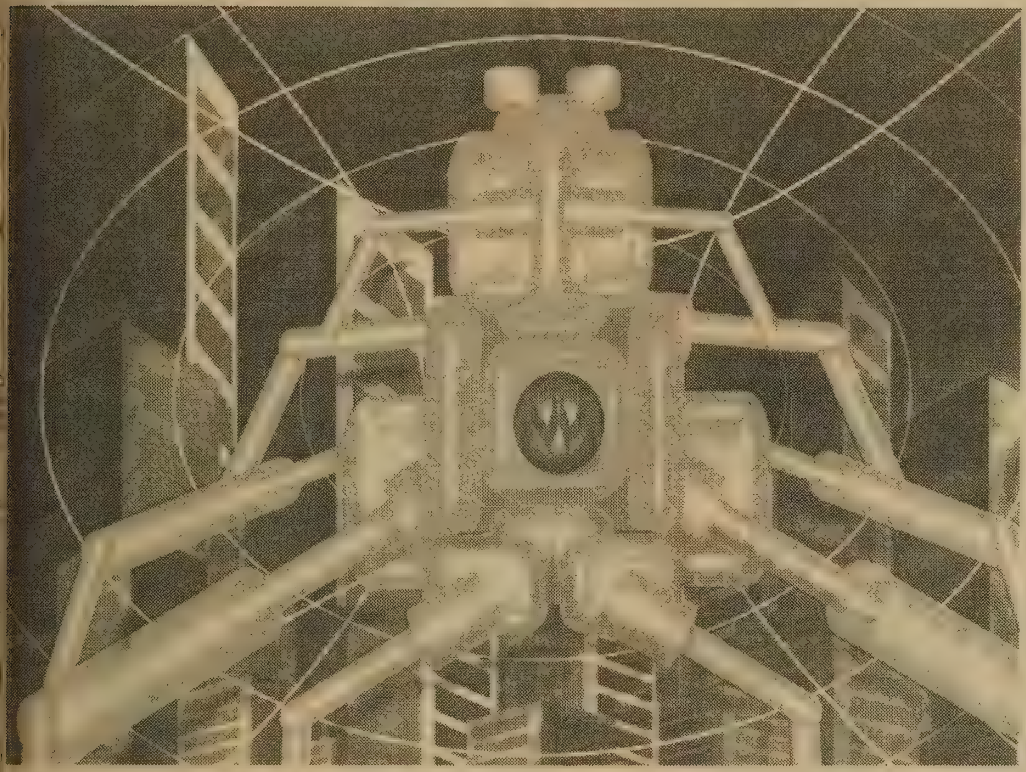

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- •Virtual Screen
- •On-the-fly Resolution and Refresh Rate

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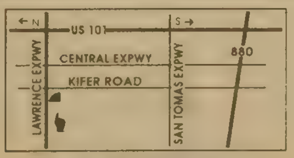

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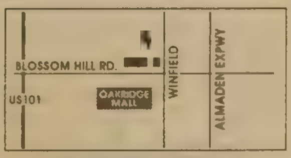

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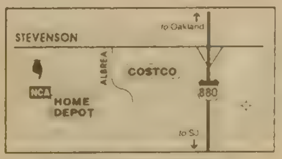

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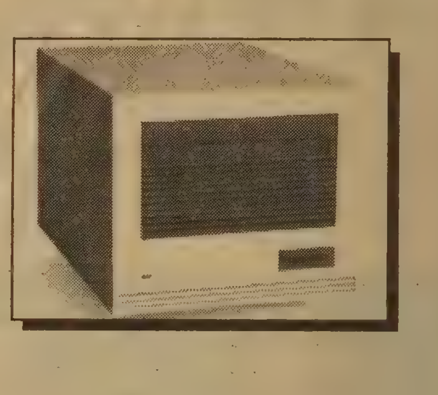

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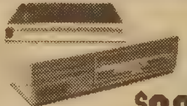

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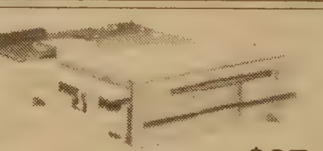

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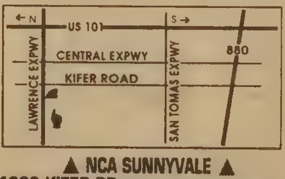

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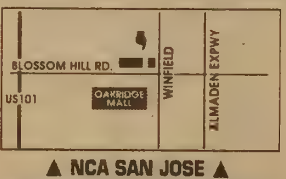

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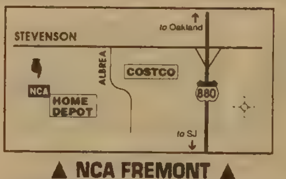

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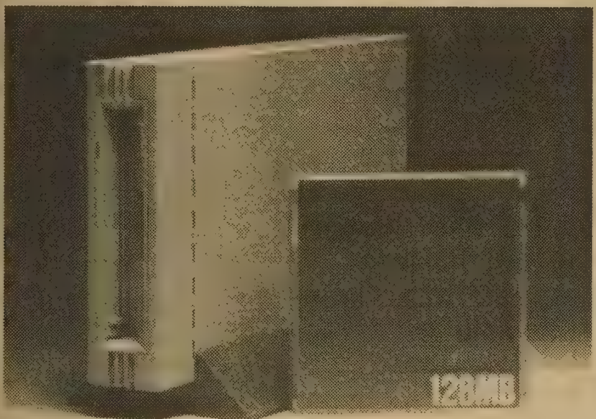
EXTERNAL SCSI 128MBYTE, 3.5" REWRITABLE OPTICAL

DynaMO™ 128



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- ▶ Using 2511A Internal
- ▶ Includes 1 Cartridge
- ▶ Fast 30ms Seek Time
- ▶ 3600RPM
- ▶ 256K Cache
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- ▶ 2511A
- ▶ Low Profile, only 1"
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- ▶ 3600RPM
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16-bit, 10 Base T and Coax Combo	$139	629	2399
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16-bit, Combo Board	$119	659	2549
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12 Port Hub	$599		
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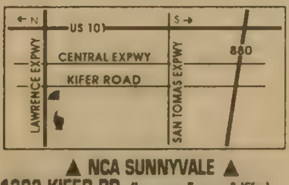

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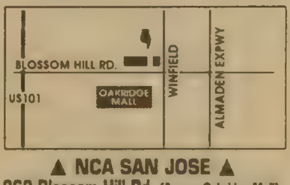

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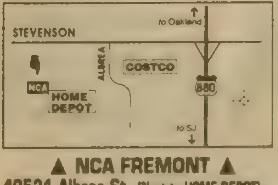

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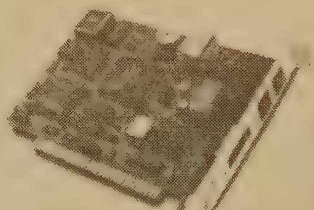

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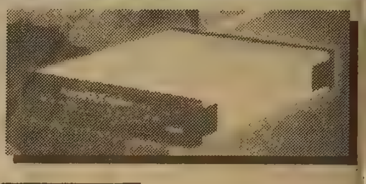

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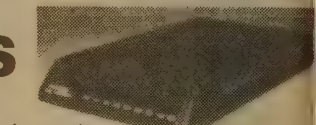

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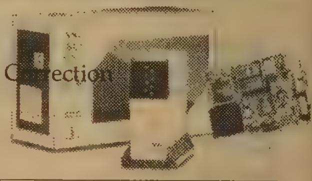

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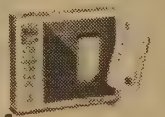

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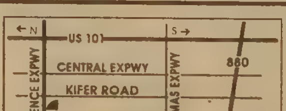

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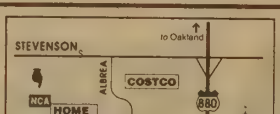

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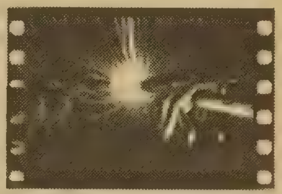

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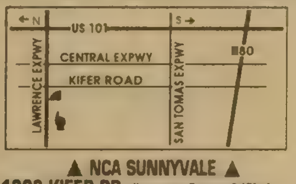

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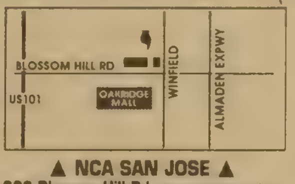

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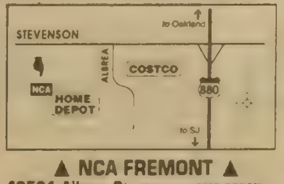

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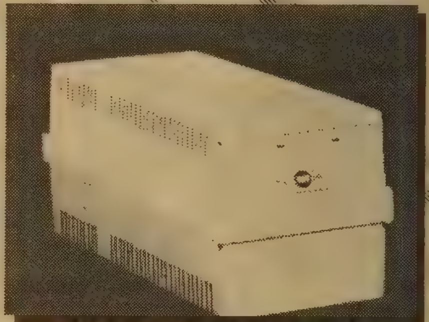

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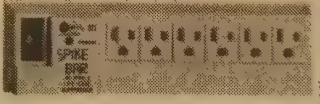

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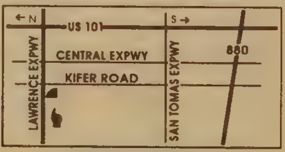

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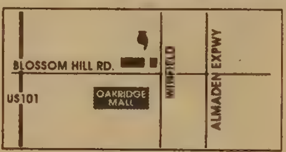

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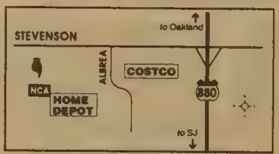

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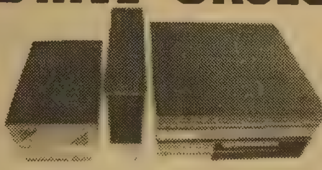

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ScanMan 32	$99.99
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NAME	PRICE
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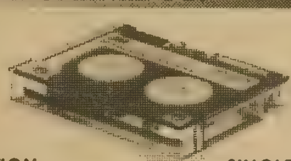

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SYQUEST 44MB SQ400	$65.00	$309
SYQUEST 88MB SQ800	$99	$489
SYQUEST 105MB 3.5"	$69	$345
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RICOH 128MB	$49	239
MAXELL 128MB OPTICAL	$42	199
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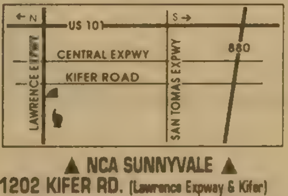

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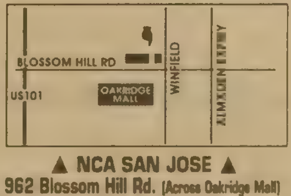

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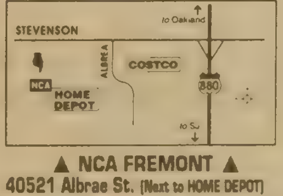

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employees are, of course. But these traits are particularly important for telecommuters. So are good time-management skills, and a thorough knowledge of the organization and its mission. In the office, it's easy to keep on course, and to ask for help or direction if you get lost. But when telecommuting, you must be more self-sufficient in all these areas.

The ideal telecommuters are also comfortable with the part-time isolation it brings: eating lunch alone, not seeing other workers every day, working through the telephone instead of in-person.

Prospective supervisors of telecommuters should have a positive attitude toward this style of work, and should be effective communicators who can define tasks and expectations. They should want their telecommuters to succeed, and should also have strong work-related reasons to favor telecommuting. Perhaps most important, they should feel comfortable evaluating performance by results instead of by hours worked.

By forcing supervisors to rate their employees on results, the whole organization tends to become more efficient and effective.

What kind of employment situations make the best use of telecommuting? From a management perspective, look for a situation where telecommuting is likely to increase productivity, which it does by reducing the number of interruptions, and by leaving the employee fresher because he or she avoids the physical commute.

Telecommuting tends to improve productivity because the only evidence to show that work is being accomplished is the telecommuters' output, so they generally make darn sure their output is satisfactory. Also, by forcing supervisors to rate their employees on results, the whole organization tends to become more efficient and effective.

Employee recruiting is enhanced with telecommuting, which functions as a strategic asset to aid in recruiting the best workers. In fact, many competitive organizations are reluctant to publicize their willingness to let employees telecommute because they don't want their competitors doing the same thing.

Telecommuting works well when there are sudden workload peaks. In these rush situations, telecommuters are not concerned about missing the bus or walking home after dark. So they are more willing to steadily plug ahead until all the work is done. ■

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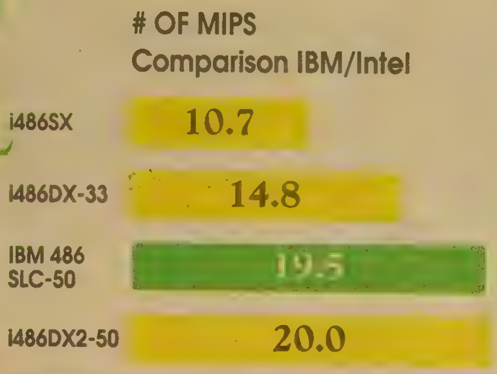

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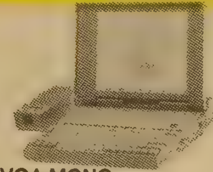

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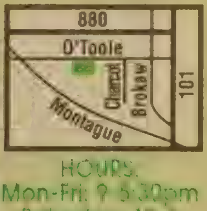

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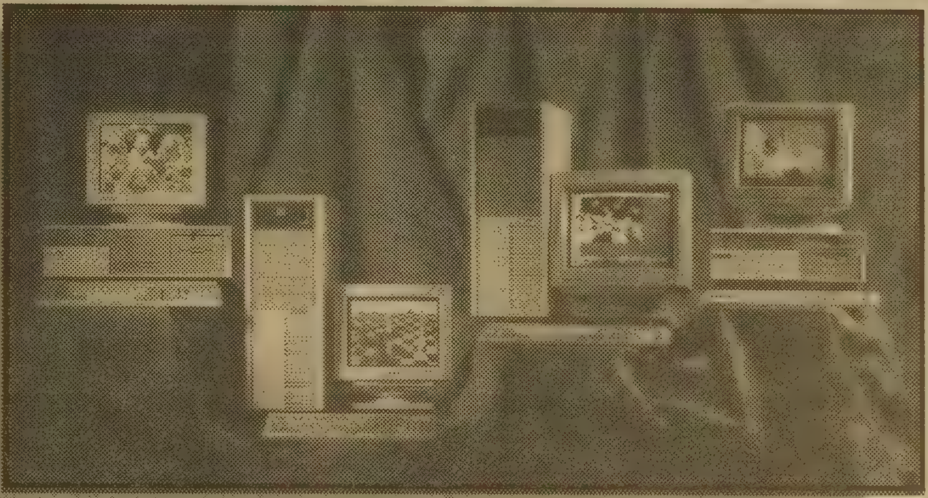

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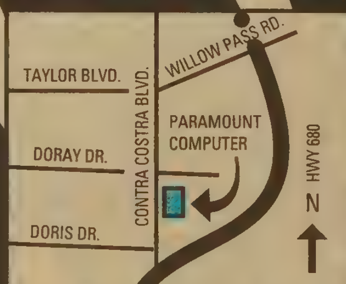

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PARAMOUNT COMPUTER

Continued from page 196

REVIEWS

PC Software Reviews

CARDSNOW

Published By: Topitzes & Associates, Inc.
List Price: $39 (additional clip art collections, $19 each or three for $49)
Reviewed By: Ed Kahn

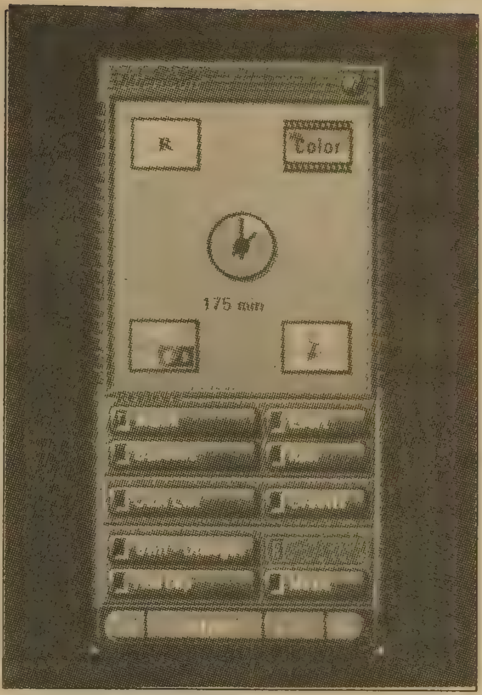
One of the things I had hoped to do on my computer after I got my first laser printer was create business cards. After all, working in either DOS or Windows should give me all the fonts I would need and it seemed that it should be easy enough to design an attractive business card and print it out on my high-quality printer.

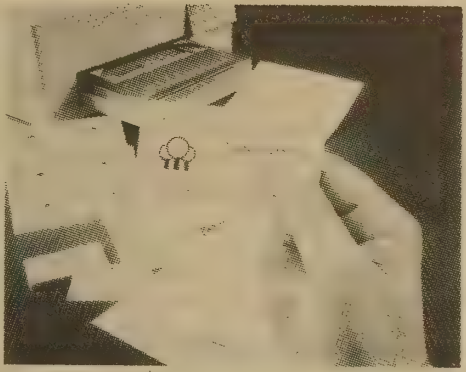
But, alas, the quest for the software to do what seemed like a simple task proved elusive for quite some time. Finally, last year, someone told me about CardsNow, a program that runs in MS-DOS and comes with a starting supply of card stock. More recently, a new edition was released that works with both laser and inkjet printers.

CardsNow lets you design a standard business card with or without graphics. You can select up to two fonts, one for the primary line or lines, and one for the remaining lines which would include such information as phone numbers, addresses, and perhaps a descriptive line. Unfortunately, the choice of fonts and sizes is limited, but certainly adequate.

It comes with a set of clip art images that can be used in the cards. Topitzes & Associates sells additional graphics packages designed for the building trades, music, religious groups, schools, and several other audiences. Art from other sources can be imported or you can have your artwork scanned for $39 by Topitzes & Associates.

I found the program easy to use and quite satisfactory for simple business cards. After designing the card, you can print directly onto the card stock or a sheet of standard paper. On my first attempt, I printed on the card stock. I was a little disappointed because the perforations on the card stock were a little off, making the cards not completely centered. The next time, I decided to print onto plain white paper stock and then went to a copy shop and had it copied onto an attractive card stock in a color of my choice and cut to size.





Top: Cinemania by Microsoft; bottom: CardsNow by Topitzes & Associates, Inc.

While the cards you get with this program are certainly not comparable to expensive cards with multiple colors and raised type that are printed by a print shop, the output is quite satisfactory, especially for cards you need in a hurry. CardsNow is exactly what I expected when I first dreamed of making my own business cards on my LaserJet. Still, I look forward to a Windows version of the program that will offer greater choice of fonts and type size. (Topitzes & Associates, Inc., 4200 University Ave., Suite 2000, Madison, WI 53705-2159. 1-800-233-9767)

CINEMANIA

Published By: Microsoft
List Price: $99
Reviewed By: Rich Grace

Cinemania is a wonderful reference, offering any movie enthusiast a real treat. The CD-ROM disc is comprised of a database of short movie assessments—almost nineteen thousand movies from the US and abroad, from the 1915 release of *Birth of a Nation* to the present. Cinemania offers a large number of remarkably crisp grayscale movie stills and photos of major movie stars, directors, and personalities of the screen (and biographies and filmographies as well), and extends into the multimedia realm with dialog clips from selected classic movies.

As could probably be expected, the sound clips are of indifferent quality (and you need a sound card to take advantage of them); but for those whose computers are mute, Cinemania still has lots to offer. The user interface replicates a video remote-control, and is otherwise relatively sparse. The content is absorbing, however, particularly in the detailed reviews. I've rediscovered some wonderful movies I had long since forgotten, and have whiled away numerous late-night hours hunting down movies to see what critical assessments are offered. Occasionally, of course, I don't agree with Leonard Maltin's reviews (who always agrees with movie critics anyway?), but that's not his fault, and his style is engaging and informative. I could also have done without the large number of TV movies that were included

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in the disc. Also note that the list of movies can be numbing after awhile, but you can accelerate the search by specifying a title or part of one. You can also be impressed by the sheer number of silly and useless movies that have been immortalized in celluloid! (Microsoft Corp., 206/882-8080)

MS-DOS 6.2

Published By: Microsoft

Reviewed By: Woody Liswood

MS-DOS 6.2, the upgrade to 6.0, is here and is also free—at least it is free if you download it from CompuServe.

Among the new features that Microsoft has added is one called Scandisk—something that you might feel like me that it should have been there all along. In many ways Scandisk takes the place of Chkdsk, which is still there, and will fix a variety of disk errors such as crosslinks and logical lost clusters, as well as performing a surface scan to fix physical disk errors.

One of the biggest complaints about 6.0 was problems associated with Doublespace. Microsoft's analysis told it that the majority of these problems were caused by users turning off their computer before Smartdrv could finish writing to the hard drive. To resolve this, DOS 6.2 installs Smartdrv without write caching turned on. Thus, when you write to cache, no longer will you see a DOS prompt until the write cache is written to the disk. To be honest, I can't "see" the difference, but Microsoft assures me that is what is happening.

One of my favorite features of 6.0—the ability to step your way through the config.sys file—has been extended to the autoexec.bat startup in 6.2. Yes, you can now step your way through the autoexec.bat. Stepping also works for other .bat files you may have called in your autoexec.bat file.

Diskcopy has *finally* been improved to work as a single pass copy program.

Have you ever moved or copied a file, only to overwrite a version of the file you really wanted to keep? In 6.2, Move, Copy, and Xcopy warns you when you are about to overwrite a file and asks for permission to do so.

A welcome addition to Smartdrv is that it now caches CD-ROM drives.

DOS 6.2 is the way to go. If you've got 6.0, get the upgrade. If you're still running DOS 5.0, you really need to upgrade today. The features of 6.0 and 6.2 are well worth it. The wait now begins for the release of MS-DOS 7.0 which, if rumors are correct, will be 100% graphical. (Microsoft Corp., 206/882-8080)

FORMS XPERT

Published By: Horizon Software

For: MS-DOS

List Price: $295, with substantial seasonal discounts in fall and spring

Reviewed By: David A. Simon, CPA

Anyone needing to prepare a low volume of any specific tax return (other than for individual income tax) can either buy specialized, sometimes costly tax software or prepare the returns by hand. If you go the manual route, stock up on white-out; every time you revise one item, you'll likely need to carry the revision through to other lines throughout the return.

Forms Xpert offers a middle ground between these two choices. This software package consists of over one hundred "smart" forms. Unlike tax preparation software, Forms Xpert won't automatically decide which schedule and on what line an item should be reported. But neither is it simply a blank form presented on your computer.

Rather than straight, fill-in-the-blanks format, blank forms, Forms Xpert contains arithmetic logic, automatically adding numbers and carrying them forward to other schedules as indicated on each form.

Forms Xpert includes forms for estate tax returns, qualified retirement plans, and income tax returns for fiduciaries, partnerships, corporations, and nonprofit entities, plus a variety of miscellaneous forms. The program includes its own laser soft fonts. Alternatively, you can use the Hewlett-Packard tax fonts cartridge, or equivalent.

I tested the package on a client's estate tax return. To assure adequate control, I prepared spreadsheets and checked that each total on my spreadsheets agreed with the return. The program performed flawlessly. I had no trouble running it and never needed to refer to the documentation. The output on my laser printer was very sharp and far more professional looking than had the return been manually typed, and clerical preparation was infinitely easier. (Horizon Software Corp., 2213 M Street N.W., Washington, DC 20037. 202/872-0295)

WORLD LIBRARY: LIBRARY OF THE FUTURE

Published By: World Library Inc.

List Price: $295

Reviewed By: Rich Grace

The scope of this product is monumental. The Library of the Future is an attempt—largely successful—to provide a CD-ROM of the enduring works of world literature, including history, philosophy, and religious works. It's like having the *Great Books of the Encyclopedia Brittanica* on a disk, but the scope is even greater than that. Virtually every Classical Greek and Roman work is present, as is the *Bhagavad-Gita*, the *Koran*, the *King James Bible*, the Egyptian *Book of the Dead*, the Mayan *Popol Vuh*, the *Book of Mormon*, plus the complete works of Shakespeare and Sir Arthur Conan Doyle, massive numbers of ancient and modern novelists and poets, and so on. If you can name a classic author, you will probably find them here!

While it's possible to print out an entire book for reading in hard copy, the real strength of this disc is its convenience for students and writers who need to reference or excerpt a major work and don't feel like retyping an entire paragraph or page from a book. For that purpose, and despite the somewhat unfriendly user interface, it is fairly easy to search by title and then look for a known sequence of words in the text. Unfortunately, it was difficult to select more than a paragraph or two in either the DOS or Windows ver-

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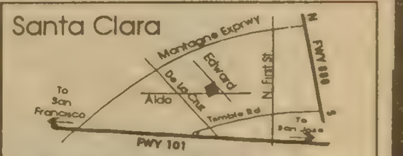

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sions—you can't easily scroll down as you select text. This makes cutting and pasting large blocks of text difficult or sometimes impossible.

For anyone with a laptop, the ability to select a single book and save it as a file for portable reading is a major selling point. To do this you must print a book to a file (rather than selecting the text and saving it out). Even after printing the text to a file, you will find frequent and distracting paragraph and chapter notations, which may be a leftover from the OCR process of building the text files. Also, despite the massive scope of the disk, I found myself missing many titles—only one of Friedrich Nietzsche's major works is present, and many classic novelists are represented by just one work. (World Library states that many missing titles will be added in an upcoming release).

Despite my complaints, Library of the Future contains many books which can sometimes be difficult to find in the typical bookstore. Much to my surprise, I was fairly comfortable reading books on the computer screen instead of in hard copy. This disc fills many major gaps in my library. I recommend Library of the Future as a product with great potential, which fills a good niche as a reference source. With an update to fix glitches in text portability and glaring title omissions, Library of the Future will be an outstanding product for any literate computer user. (World Library, Inc., 1-800-443-0238)

Game Reviews

DUNGEON HACK

Designed By: Tom Holmes
Produced By: Dreamforge Intertainment
Published By: Strategic Simulations
For: MS-DOS 386/486 (2MB RAM; VGA graphics; Microsoft mouse; sound: Sound Blaster Pro+Adlib+Roland)
List Price: $49.99
Reviewed By: Fred Haslam

Welcome to the Hero Motel. The heroes go in, but they don't come out.

Dungeon Hack is the latest maze game released by SSI. It should not be confused with the legendary shareware game Hack, although there are similarities. Both are maze games with monsters, magic, and mysteries; and both ask you to find an Orb at the bottom (hmm). But Dungeon Hack uses 256-color, real-time, point-of-view graphics whereas the original Hack used the ASCII character set. Also, this new Hack has high-quality music, voices, and sound effects. If you hear a sound like someone clearing his throat, that means there is a monster nearby.

The dungeon is built using the Advanced Dungeons & Dragons role-playing system, although no actual role-playing occurs. The game consists solely of killing monsters, gathering treasures, and figuring out which key to use on which door. I like this type of game. Both Dungeon Master and Ultima Underworld have done this very well. It is done a little more weakly by Dungeon Hack.

The main advantage of this new game is its random dungeon generator. Master and Ultima have fixed dungeons. The randomizer gives you more variety, but the fixed dungeons tend to have more clever puzzles and layouts. Dungeon Hack claims to generate *four billion* different mazes. An impressive number until you examine it closely. A good approximation of four billion is two to the thirty-second power. In other words, there are thirty-two things that change from level to level. On the average this means sixteen things have changed. Not quite as impressive.

The interface is nicely intuitive. I was able to figure out everything for myself. I made a few mistakes trying to use things without putting them into my characters' hands, but I resolved that problem quickly. Despite the jerky animation, the artwork is quite attractive. The floors, doors, and walls have a number of amusing themes; while a variety of tapestries, sconces, and murals break the tedium of moving through repetitive corridors.

As a dungeon game, Dungeon Hack is competent but not great. While I expect characters to die in a dungeon game, I had four characters starve to death before one managed to gain a single level. I played that character for two solid hours before getting to the next level. This was not a very satisfying time/reward ratio. Somehow, the original Hack conveyed more personality with 256 characters than

Continued on page 303

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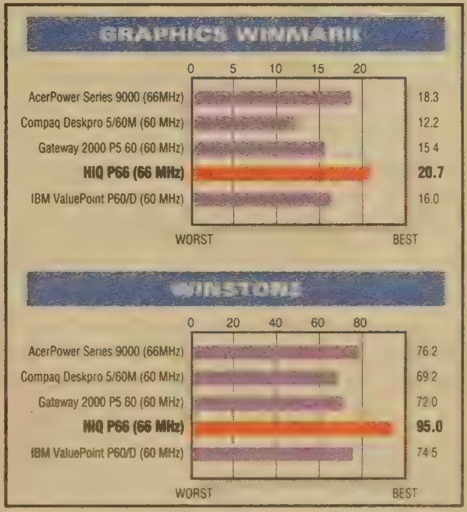

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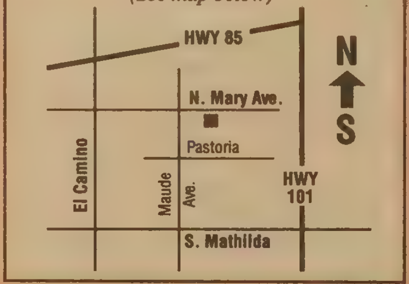

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continued from page 154

• Bernard Aboba, BMUGer and author of the excellent *Online Users Encyclopedia*
I was a graduate student at Stanford when the Macintosh first came out. It was announced in January, but the student purchase program took a while to work out, so they wouldn't be available until April. The problem was that I had a presentation to do on my research, and I had no easy way to make the overheads.

I had to apply to the computing people for permission to use one of the few Macs on campus, in order to do my overheads. Since no one had used a Mac for this purpose, they dubbed it "research" and let me have a few hours on one of the machines.

It took a little bit of getting used to, but within two hours, I had most of the overheads done using MacPaint. I remember thinking how easy this was compared to using a UNIX machine and the nroff editor. I knew I wanted to purchase one.

Even with the student discount, it took me another nine months to save up to purchase a Mac, a 512K. I got it with a modem, an Apple 1200bps model that was more than a little flaky. At the time MacTerminal had not come out yet, and when it did, I was still not able to communicate with the campus's UNIX machine on campus, because MacTerminal didn't support Kermit. But how could I download a copy of Kermit if I didn't already have it? This was my introduction to the telecommunications Catch-22.

Bernard Aboba:

"It took a little bit of getting used to, but within two hours, I had most of the overheads done using MacPaint. I remember thinking how easy this was compared to using a UNIX machine and the nroff editor."

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• Ilene Hoffman, BMUG Boston member and a Macintosh consultant, trainer, and writer
I came by my first Mac after realizing that my poor father would never be able to master the subtleties of MS-DOS. What does my father have to do with my Mac? Well, I could not afford a computer and he

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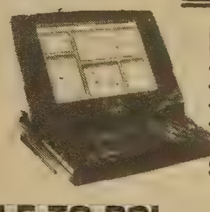

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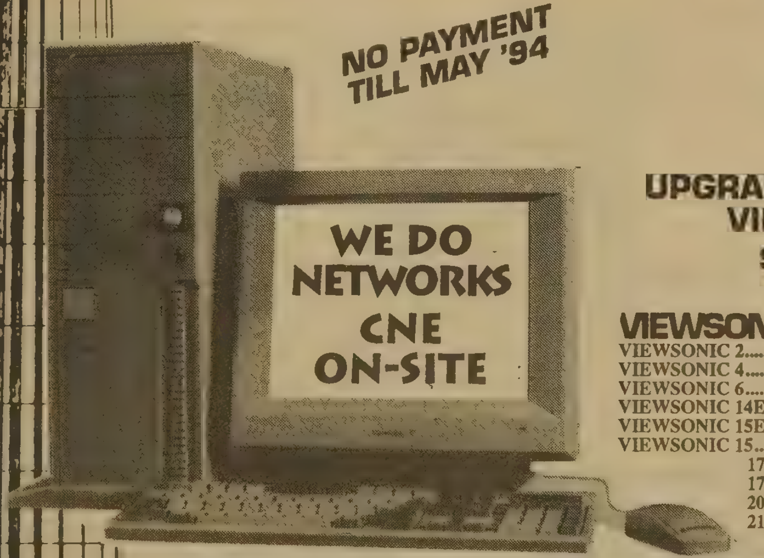

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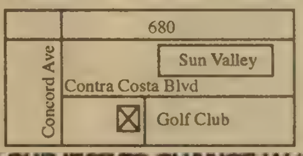

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could; I needed an IBM and he wanted a new toy! So, in joining forces, I decided that it would be infinitely easier for him to learn the Mac than the IBM. As a result he has never learned either, but his first 128K Mac still graces my home in the form of an upgraded Plus.

I remember the first time sitting down in front of this all too little screen, pushing around this plastic Ivory soap bar, all the while thinking that I felt like a fool! I thought that the Mac with its universal interface, using a trash icon for deleting files and little pictures to indicate files, made me feel like an idiot who was incapable of understanding the language that computers understood. I was insulted, but had no choice but to pursue it further, as getting a second computer was even more remote than buying any software other than what came bundled with the Mac (MacWrite and MacPaint). That was in 1984. It took me six months to adapt to using my Mac. My father never saw it again after the first month!

The Mac was for the rest of us, those that were already oriented to technological toys, stereos, mechanical things, ten-speed bikes, and other innovations. The interface was somewhat complex for the general public.

• Jeff Songster, BMUG South guy and Claris software Test Engineer

I remember my first Mac experience was the Super Bowl commercial, and my subsequent hanging out at the Macy's Computer Store.

I came from an Atari 800 hooked up to my color TV. It had 48K of RAM and two 100K 5 1/4" floppy drives, good for text only, with very crude and mostly useless graphics, except for Brøderbund's Print Shop. The 128K looked pretty incredible, with MacWrite and MacPaint included, and WYSIWYG output via the ImageWriter.

I wanted one badly when I was in college, but I couldn't afford it. As soon as my parents needed a computer for their business, we looked around and fortunately, my mother liked the Mac's keyboard better than the IBM's. I finally got my hands on one! Later I got my degree in Media Communications, and my own Mac Plus.

Since then, I've joined BMUG and gotten more and more involved. If not for the Mac and BMUG I would probably still be working for our family's construction supply business, hoping to be a professional DJ at a local radio station. The Mac and BMUG allowed me to follow my bliss. ■

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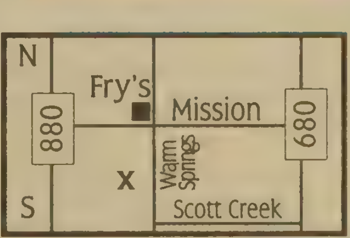

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February 10	No meeting due to University booking of meeting hall. Sorry!
February 17	ImageSmith *Yearn 2 Learn* (educational); Cheng Labs *C•A•T IV* (contact manager).
February 21	BMUG South at 1922 The Alameda, United Way Office in San Jose. Demonstrations to be announced.
February 24	Xaos Tools *cool new products*; Brøderbund *Myst* CD-ROM (interactive game).
February 28	BMUG West at Exploratorium museum in San Francisco. Demonstrations to be announced.

Please Note: BMUG main meetings are in 22 Warren Hall on the UCB campus until further notice. Call the BMUG Announcement Line for the latest information on BMUG meetings, special interest groups (SIGs), and seminars! (510)849-9114.

WHAT IS BMUG?

BMUG is an educational, nonprofit, consumer advocacy group, organized to share information and provide critical direction to users and developers in the computer community worldwide. It is an independent advocate, not affiliated with any manufacturer, delivering trustworthy information and useful products.

Like any growing organization, it is many different things to its fourteen thousand international members. BMUG supports many special interest groups (SIGs), an 18-line bulletin board system (BBS), software library, weekly meetings, publications, and much more. BMUG also puts out a semi-annual 400+ page book that we call our "newsletter."

Our motto continues to be: *We're in the business of giving away information.*

Come and join in the dialogue at the BMUG main meeting every Thursday evening, 6:30–9:30 (or whenever we finish), in 22 Warren Hall on the UC campus. BMUG West and BMUG South are monthly meetings held in San Francisco and San Jose.

The BMUG office, 2055 Center Street (a half block from the BART station), is open to the public from 9 am to 5 pm. Please come by, say hello, and meet other members.

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HKG Complete Systems

	Cache	VLB Slots	ISA Price	VLB Price
386SX-33	-	-	$659	-
386DX-40	128K	-	$705	-
486DLC-33	128K	-	$725	-
i486SX-25	256K	3	$769	$829
i486DX-33	256K	3	$975	$1,035
486DX-40	256K	3	$975	$1,035
i486DX-50	256K	3	$1,129	$1,189
i486DX2-66	256K	3	$1,179	$1,239

All Systems Include:

- 120 MB Hard Drive
- 1 MB RAM
- VLB 1 MB SVGA Card (512K For ISA)
- I/O (2 Serial, 1 Parallel, 1 Game Ports)
- 14" SVGA Color Monitor
- 1.44 MB Floppy Drive
- 32-Bit IDE (16-Bit for ISA)
- 101 Enhanced Keyboard
- Mini-Tower Case
- 1 Year Parts & LIFETIME Labor Warranty

IBM PS/Value Point

- 4 MB RAM
- SVGA Local Bus Video
- 1.44 MB Floppy Drive
- 120 MB Hard Drive
- 101 Keyboard
- 2-Button Mouse
- DOS 6.1
- Windows 3.1

intel inside

IBM

486SX-25	$1,095
486DX-33	$1,465
486DX2-66	$1,885
and more	CALL

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350 (Mono/4MB/250MB)	$CALL
350C (Color/4MB/125MB)	$CALL
750C (Active Color/4MB/170MB)	$CALL

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14" SVGA .38dp	$210
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14" SVGA .28dp NI	265
15" Impression 5, 1280x1024, .28dp, NI	375
17" Impression 7, 1280x1024, .28dp, NI	890
14" ViewSonic 4E	275
14" ViewSonic 6E, NI	299
17" ViewSonic 17 NI	999
17" KFC 1713, 1280x1024, .26dp, NI	780
15" NEC 3FGe	599
15" NEC 4FGe	709

HARD DIVERS

80 MB IDE	$169
130 MB IDE	189
170 MB IDE	204
213 MB IDE	219
245 MB IDE	239
340 MB IDE	299
540 MB IDE/SCSI	CALL
1.2/1.7 GB	CALL

VIDEO CARDS

Trident 512K	$38
Trident 1MB	60
Cirrus Logic SVGA VLB 1MB	75
Avance Logic SVGA VLB 1MB	95
Spider SVGA VLB 1MB	100
Spider Black-Widow VLB 1M/2M	230/320
Diamond SpeedStar Pro ISA/VLB	125
Diamond Stealth ISA/VLB	160
Orchid Fahrenheit VLB 1MB	165
ATI Graphics Ultra Plus 2M	249
ATI Graphics Ultra Pro 2M	365

PRINTERS

Brother HJ-400 Ink Jet	$295
Panasonic 1123	210
Panasonic 2123	245
Panasonic KX-P4410	599
HP Laser 4/4L/4M	1369/699/1899
HP 500/500C/550C	299/399/599

MISC.

2400B Modem	$29
Fax/Modem (9600/2400) Int	49
Fax/Modem 14,400/14,400 Int/Ext	140/165
Colorado Tape Back-Up 250 MB	169
Conner/Archive Tape Back-Up 250 MB w/Tape	165
Ethernet Card 16-Bit	80
Logitech Scanman 32 w/OCR Software	139/185
Logitech Scanman 256 w/OCR Software	249/299
3 Button Mouse	15
Logitech First Mouse/MouseMan	40/65
1.2/1.44 MB Floppy Drive	50
Chicony 101 Enhanced Keyboard	20

MULTIMEDIA

AT-Bus Pak

$379

- Panasonic 562 CD-ROM Drive (Double Speed, 300KB's)
- SoundBlaster 16 MCD Sound Card
- Encyclopedia CD-ROM
- Voice Recognition Software
- Pair Of Magnetic Shielded Speakers

SCSI Pak

$569

- Toshiba 3401B SCSI CD-ROM Drive (Double Speed, 300KB's 200ms)
- SoundBlaster 16 SCSI Sound Card
- Encyclopedia CD-ROM
- Voice Recognition Software
- Pair Of Magnetic Shielded Speakers

Others

• SoundBlaster 16 MultiCD (NEW) Encyclopedia CD-ROM Voice Recognition Software	$169
• SoundBlaster Pro Deluxe	125
• SoundBlaster 16 Basic	140
• Panasonic 562 CD-ROM	209
• Toshiba 3401B CD-ROM	369
• 25W Power Amplified Speakers	45
• 80W Power Amplified Speakers	69
• Twin Sound Internal Amp. Speakers	59

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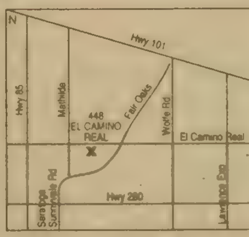

HI-TECH USA

(408) 262-8688 Milpitas
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SUPER SALE	M/B + CPU	* BASIC SYSTEM	BASIC SYS +120MB HDD +14" MONO & MGP CARD {170MB HDD ADD $40}	BASIC SYS + 120MB HDD + VGA CARD & VGA MONO {170MB HDD ADD $40}	BASIC SYS +120MB HDD + VGA CARD & VGA COLOR {170MB HDD ADD $40}	BASIC SYS +120MB HDD + SVGA CARD & MONITOR {170MB HDD ADD $40}	BASIC SYS W 4MB RAM 1.2 & 1.44 FDD +120MB HDD +SVGA CARD & MONITOR {170MB HDD ADD $40}	BASIC SYS W/4MB RAM 1.2 & 1.44 FDD +200MB HDD +SVGA CARD & MONITOR {250MB HDD ADD $30}	BASIC SYS W 4MB RAM 1.2 & 1.44 FDD +340MB HDD +SVGA CARD & MONITOR {540MB HDD ADD $170}
PENTIUM P5-66/256C VLB	$1,498	$Call	$Call	$Call	$Call	$Call	$2,178	$2,228	$2,298
PENTIUM P5-60/256C VLB	1,198	Call	Call	Call	Call	Call	1,878	1,928	1,998
486DX2-66/256C PCI	688	Call	Call	Call	Call	Call	1,368	1,418	1,488
486DX-33/256C PCI	508	Call	Call	Call	Call	Call	1,188	1,238	1,308
486SLC2-66/64C IBM VLB	258	398	654	694	754	778	938	988	1,058
486SLC2-50/64C IBM VLB	208	348	604	644	704	728	888	938	1,008
486DX2-66/128C VLB	468	628	864	904	964	988	1,148	1,198	1,268
486DX-50/128C VLB	418	578	814	854	914	938	1,098	1,148	1,218
486DX2-50/128C VLB	328	488	724	764	824	848	1,008	1,058	1,128
486DX-40/128C VLB	314	448	710	750	810	834	994	1,044	1,114
486DX-33/128C VLB	298	454	694	734	794	818	978	1,028	1,098
486DLC-40/128C VLB	144	280	540	580	640	664	824	874	944
486DX2-66/128C NICE EISA VLB	638	778	1,034	1,074	1,134	1,158	1,318	1,368	1,438
486DX-50/128C NICE EISA VLB	598	738	994	1,034	1,094	1,118	1,278	1,328	1,398
486DX-33/128C NICE EISA VLB	439	578	834	874	934	958	1,118	1,168	1,238
486SLC2-50C IBM ISA	170	324	566	606	666	690	850	900	970
486DX2-66C ISA	438	598	834	874	934	958	1,118	1,168	1,238
486DX-50/128C ISA	408	568	804	844	904	928	1,088	1,138	1,208
486DX2-50C ISA	298	458	694	734	794	818	978	1,028	1,098
486DX-40/128C ISA	308	446	704	744	804	828	988	1,038	1,108
486DX-33C ISA	288	444	684	724	784	808	968	1,018	1,088
486SX-33C ISA	162	320	558	598	658	682	842	892	962
486SX-25C ISA	134	292	530	570	630	654	814	864	934
486DLC-40/64C ISA	134	272	530	570	630	654	814	864	934
486SLC-33 ISA	92	238	488	528	588	612	772	822	892
386DX-40/64C	98	234	494	534	594	618	778	828	898
386SX-40	70	226	466	506	566	590	750	800	870
386SX-33	64	220	460	500	560	584	744	794	864

*** BASIC SYSTEM CONFIGURATION:** Motherboard & CPU, 1MB memory installed, 1:1 2HD/2FD controller with 2S/1P/1G, 1.2MB or 1.44MB Floppy Drive, Internal Clock/Calendar, Enhance Case with Power Supply, and 101-Key Enhanced Keyboard.

VESA MULTIMEDIA SYSTEM

- 128KB/64KB Cache Memory
- 4MB High Speed RAM
- 1.2MB & 1.44MB Floppy Drive
- VLB IDE controller w/2S/1P/1G
- 200MB Fast IDE Hard Drive
- Cirrus Logic VLB w/1MB
- 14" SVGA .28 Color Monitor
- Medium Tower Case w/Power Supply
- Focus 2001 Keyboard
- Double Speed CD-ROM
- Deluxe Speakers
- Sound Blaster Pro Deluxe
- Free CD Deluxe Pak (4 Titles)

486DLC-40 VLB $1,29
486SLC2-66 VLB.......$1,39
486SX-25 VLB $1,31
486DX-33 VLB $1,48
486DX2-66 VLB........$1,66

UPGRADES

- 250MB Hard Drive........................Add $2
- 340MB Hard Drive........................Add $6
- 540MB Hard Drive.......................Add $23
- 14" Non-Interlaced Monitor ....Add $2
- 15" Non-Interlaced Monitor ....Add $12
- 17" Non-Interlaced Monitor ....Add $38

Best Prices in Town!

DELUXE SYSTEMS

386SX-33	$768
386SX-40	778
386DX-40/64K	788
486SX-25/128K	868
486SX-33/128K	888
486DLC-40/64K	818
486DX-33/128K	978
486DX-40/128K	998
486DX2-50/128K	1,008
486DX-50/128K	1,158
486DX2-66/128K	1,188
486 DX-33/128K EISA	1,148
486DX-50/128K EISA	1,278
486DX2-66/128K EISA	1,328
486SLC2-50/64K VLB	898
486SLC2-66/64K VLB	948
486DLC-40/128K VLB	828
486DX-33/128K VLB	988
486DX-40/128K VLB	1,008
486DX2-50/128K VLB	1,018
486DX-50/128K VLB	1,168
486DX2-66/128K VLB	1,198
486DX-33/256K PCI	1,218
486DX2-66/256K PCI	1,398
Pentium P5-60/256K VLB	1,898
Pentium P5-66/256K VLB	2,198

SYSTEM CONFIGURATION

- Motherboard w/CPU
- 4MB RAM 70NS
- 120MB Fast Hard Drive
- 1.2MB and 1.44MB Floppy Drive
- IDE 2HD/2FD Controller w/2S/1P/1G
- 512KB SVGA Card
- 14" SVGA .28 Color Monitor
- 101-Key Enhanced Keyboard
- Enhanced Case w/Power Supply
- Microsoft Compatible Mouse w/Pad

UPGRADES

170MB Hard Drive	Add $40
200MB Hard Drive	Add $50
250MB Hard Drive	Add $70
340MB Hard Drive	Add $120
540MB Hard Drive	Add $280
14" Non-Interlaced Monitor	Add $20
15" Non-Interlaced Monitor	Add $120
VLB IDE Controller	Add $20
PCI Bus VGA Card w/1MB	Add $100
16BIT SVGA Card w/1MB	Add $20
Window Accelerator w/1MB	Add $30
Orchid Fahrenheit 1280	Add $110
Diamond S.S. Pro VLB w/1MB	Add $70
250MB Tape Back-up	Add $130
16BIT Ethernet Card	Add $50
Deluxe Speakers	Add $10
Sony or Mitsumi CD-ROM w/Card	Add $150
Double Speed CD-ROM w/Card	Add $190
Sound Blaster Pro Deluxe	Add $110
Mediavision Jazz 16	Add $120
CD Deluxe Pak (4 Titles)	Add $25

BEST BUY NOTEBOOKS

- **4MB RAM**
- **120MB HARD DRIVE**
- **1.44 FLOPPY DRIVE**
- **1S / 1P**
- **BUILT-IN TRACKBALL**
- **BATTERY PACK**
- **CARRYING CASE**

Super Sales	VGA Mono	Dual Scan Color	Active Matrix Color
486SX-25	$1,298	$1,998	$2,748
486SX-33	1,348	2,048	2,798
486DX-33	1,498	2,178	2,928
486DX2-50	1,518	2,198	2,948
486DX2-66	1,698	2,378	3,128

UPGRADES

PCM CIA Slot Model	Add $250
Microsoft DOS 6.2	Add $50
8MB RAM	Add $248
200MB Hard Drive	Add $120
340MB Hard Drive	Add $330
Internal Battery Pak	Add $95
Internal Fax Modem	Add $124
Pocket Fax Modem	Add $120
Docking Station	Add $375

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- 8MB High Speed RAM
- TEAC 1.2MB & 1.44MB Floppy Driv
- VLB IDE controller w/2S/1P/1G
- Diamond Speed Star Pro VLB w/1M
- 200MB Fast IDE Hard Drive
- Focus 2001 Keyboard
- Viewsonic 15E (15") SVGA Monitor
- Medium Tower Case w/Power Supp

Pentium P5-60/256K..$2,49
Pentium P5-66/256K..$2,79

UPGRADES

- AMI Flash BIOS ....Add $4
- 340MB Hard Drive.........................Add $6
- 540MB Hard Drive.......................Add $23
- Diamond Stealth VLB 1MB ....Add $4
- Diamond Viper VLB 2MB..............Add $25
- 17" SVGA Monitor ....Add $22

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Edutainment CD 8 Upgrade Kit	416
Edutainment CD 16 Upgrade Kit	460
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Mediavision Jazz 16	118
Mediavision Pro Audio Spectrum 16	128
Mediavision Pro Audio Studio 16	188
Orchid Gamewave Sound Card (AT)	148
Orchid Soundwave Sound Card (AT)	218
Chinon CDS535 (Int.) SCSI	316
Mitsumi CD-ROM (350MS) w/Card	136
Mitsumi CD-ROM (Double Speed) w/Card	186
NEC CD-ROM 84 (SCSI) Internal	326
Orchid CDS3110 (Double Speed) w/Card	218
Panasonic CD-522 w/Card	148
Panasonic CD-562 (Double Speed) w/Card	186
SONY CD-ROM 31A w/Card	136
SONY CD-ROM (Double Speed) w/Card	186
TEXEL	
DM3021 (SCSI) Internal	198
DM5021 (SCSI) External	278
DM3028 (SCSI) Internal	348
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Trantor SCSI Host w/Driver	50
Audio Pak (Sound Card, Speaker, Joystick, Earphone)	56
Deluxe Speakers	10

CD SOFTWARE TITLES

American Business Phone Book-1992	16
Animals v1.0 DOS	14
Arthur's Teacher Trouble	20
Atlas Pak v3.1 World/US	19
Battle Chess DOS	15
Beyond the Wall of Stars	19
Beauty & Beast MPC	12
Bring the World to Your Senses	11
Campton's Encyclopedia MPC	54
Carmen San Diego DOS	18
CD Deluxe Pak (Chess Master 3000, Mavis Teaches Typing, US Altas, World Atlas)	25
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CD Storytime DOS	14
Chess master 3000 MPC	15
Composer Quest MPC	23
Desert Storm MPC/MAC	16
Dictionary of the Living World	23
Dinosaur Adventure	19
Family Choice/Britannica DOS	16
Family Doctor DOS/MAC	16
Family Education Collections DOS	16
Great Cities-Vol 1 / Vol 2 DOS	16
Jets & Props MPC	19
Jones in Fast Lane MPC	14
King's Quest V DOS	13
Kodak Photo CD Access	12
Language of the World	22
Loom From Lucas Film DOS	15
Macmillan Dictionary For Children	18
Mantis Experimental Fighter	15
Mario is Missing/World Atlas 3.2	15
Mavis Teaches Typing MPC	15
Mayo Clinic Family Health	16
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Microsoft Bookshelf MPC	50
Microsoft Works MPC	50
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Mixed-up Mother Goose MPC	15
Monkey Island DOS	15
MPC Audubon's Mammals	14
National Geographic Mammals DOS	19
National Park	16
Ocean Digital Imagery VI DOS	18
PC SIG 12th Edition	22
Peter & Wolf MPC	12
Playing with Language (English)	21
Playing with Language (French)	21
Playing with Language (German)	21
Playing with Language (Japanese)	21
Playing with Language (Spanish)	21
Publish It 2.0 DOS	18
Secret Weapons/Luftwf DOS	14
Sherlock Holmes DOS	15
Sleeping Beauty	14
So Much Shareware II DOS	13
So Much Shareware III DOS	17
Sound Library MPC	11
Space Adventure	23
Space Quest IV By Sierra DOS	18
Space Shuttle	18
Sport's Best (3 in 1) DOS	18
Stellar 7 DOS	14
Survey of Western Art MPC	24
The Seventh Guest	44
The Right College	18
Time Almanac 1991 DOS	15
Time Table of History DOS	15
Tool Works Reference Library	18
Tool Works Encyclopedia MPC	38
Total Baseball DOS/MAC	16
US Atlas v3.1 MPC	14
US History DOS/MAC	16
USA Wars: Civil War DOS/MAC	24
USA Wars: Vietnam DOS/MAC	24
USA Wars: WW II DOS/MAC	24
USA Wars: Korea	24
Willy Bearnish The Adventure	18
Wing Command & Ult VI DOS	15
World Atlas v3.2 MPC	11
World View DOS	10

CONTROLLERS

IDE 2FD/2HD with 2S/1P/1G	$11
IDE with I/O for VESA Local Bus	26
Adaptec	
1542CF (SCSI)	174
1542CFK w/Kit (SCSI)	230
1742A EISA (SCSI)	318
2742 EISA (SCSI)	298
2742TK EISA (SCSI)	354
2742T EISA (Twin SCSI)	324
2842VLK EISA VLB (SCSI)	280
Asus EISA (SCSI)	258
Asus PCI (SCSI)	288
BusLogic 445S VLB (SCSI)	258
BusLogic 742K EISA (SCSI)	258
DTC 2290 EISA IDE	118
DTC 2280 ISA IDE	16
DTC 2270 VLB IDE	68
DTC 3290 EISA SCSI	418
Promise DC-200 IDE Cache Controller	94
Promise DC-420 VLB w/512K Cache	114
Promise DC-4030 VLB IDE Cache Controller	124

HARD DRIVES

120MB 19MS / 130MB 15MS IDE	150 / 168
170MB 17MS / 212MB 15MS IDE	180 / 192
250MB 15MS / 340MB 12MS IDE	208 / 250
420MB 12MS / 540MB 12MS IDE	318 / 418
200MB 15MS SCSI	238
340MB 13MS SCSI	338
540MB 12MS SCSI	468
877MB 12MS SCSI	638
1.2GB 13MS SCSI	828
2.0GB 13MS SCSI	1,128

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Focus	
FK2001 101-Key Click	$32
FK7000 w/Trackball	48
FK8000 w/Calculator	45
FK9000 Programmable.	53
Keytronics 101-Key Enhanced	27
Mitsumi 101-Key Enhanced	15
Maxiswitch 101-Key Enhanced	23
Maxipro II Programmable	53
Northgate	
OMNI 101 NI / 102	64 / 64
OMNI Ultra T or F	86

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387DX-33	50
387SX-33	49
387SX-25	48

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Fax Modem (9600 Fax/2400 Modem)	38
Fax Modem (14,400 Fax/14,400Modem) Int.	108
Fax Modem (14,400 Fax/14,400Modem) Ext.	138
Pocket Fax Modem (14,400/14,400)	196
Hayes Accura 14400 Fax Modem Int	218
Intel	
14.4 Fax Modem Int/Ext	158 / 178
96/96 Fax Modem Int/Ext	148 / 158
US Robotics	
Sportster 9600 Modem Int	138
Sportster 14400 Modem Int	144
Sportster 14400 Modem Ext	156
Sportster 14400 Fax Modem Int	142
Sportster 14400 Fax Modem Ext	160

MONITORS

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14" VGA Mono	100
14" VGA (640•480) .51	168
14" VGA (640•480) .39	170
14" Super VGA 1024•768 .39	186
14" Super VGA 1024•768 .28 Int	214
14" Super VGA 1024•768 .28 NI	234
15" Super VGA 1280•768 .28 NI	328
17" Super VGA 1280•768 .28 NI	588
CTX	
14" Super VGA 1024•768 .28 Int	230
14" Super VGA 1024•768 .28 NI	250
CMS1561 15" 1024•768 .28 NI	350
CMS1561LR 15' 1024•768 .28 NI	370
CPS1760LR 17" 1280•1024 MPR II	728
Hitachi	
CM1584MV 15" 1280•1024 .28 NI	444
CM2095 20" 1280•1024 .31 NI	1,258
CM2187M 21" 1600•1280 Microp	2,044
MAG	
15F(LR) 15" 1280•1024 .28 NI	464
MX17F 17" 1280•1024 .26 NI (Original)	838
NANAO	
F340IW 15" 1024•768 .28 72Hz	520
F550I 17" 1280•1024 .28 NI	894
F550IW 17' 1280•1024 .28 75Hz	1,048
T560I 17" 1280•1024 .25	1,598
F560IW 17" 1280•1024 .26 TRIN	1,288
T660I 20" 1280•1024 .31 72Hz	2,298
NEC	
3V 15' 1024•768 .28NI	522
3FGe 15" 1024•768 .28 NI	566
4FGe 15" 1024•768 .28 NI	664
5FGe 17" 1024•768 .28 NI	1,044
5FGp 17" 1280•1024 .28 NI	1,384
SONY	
1430 14" 1024•768 .25 NI	544
1604S 17" 1024•768 .25 NI	884
1730 17" 1024•768 .25 NI	944
17SE 17" 1600•1280 .25 NI	1,198
VIEWSONIC	
4E 14" 1024•768 .28 Int	254
6E 14" 1024•768 .28 NI	274
7 17" 1280•1024 .28 NI	778
15E 15" 1024•768 .28 NI	368
15 15" 1280•1024 .28 NI	428
17 17" 1600•1280 .28 NI	928
8 20" 1280•1024 .28 NI	1,438
20 20" 1600•1280 .28 NI	1,498
21 21" 1600•1280 .26 NI	1,748

MOUSE

3-Button Microsoft Compatible	$8
Logitech	
Cordless	82
Mouseman Serial/Bus	38 / 58
Trackman	74
Scanman 256	198
Microsoft Mouse Serial/Bus	32 / 58

NETWORK

8 BIT Ethernet Cards (NE1000 Compatible)	$38
16 BIT Ethernet Cards (10 Base-T/Coax)	41
16 BIT Ethernet Cards (3-in-1 Combo)	45
16 BIT Ethernet Cards (Pocket for Notebook)	124
16 BIT Busmaster (NE2100 Compatible)	80
ANSEL	
P-NS2000-TA 10 Base-T & AUI	86
P-NS2000-3 10 Base-T & 2 & AUI	108
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4-Port Passive Hub	12
8-Port Active Hub	102
Bus Topology 8 BIT ISA Card	40
Bus Topology 16 BIT ISA Card	46
Star Topology 8 BIT ISA Card	40
Star Topology 16 BIT ISA Card	46
BootROM	
8 BIT or 16 BIT Auto Boot PROM	12
Hubs and Repeaters	
4-Port 10 Base T HUB	118
12-Port 10 Base T HUB	308
16-Port 10 Base T HUB	388
2 BNC Ethernet Repeater	184

PRINTERS

Citizen	
GSX-190 (9-Pin) / GSX-220 (24-Pin)	$158 / 188
GSX-230 / GSX-240 (24-Pin) Quiet	238 / 288
GSX-145 (24-Pin) Wide	358
Color Option for Citizen Printers	48/68
Panasonic	
KX-P1150 (19-Pin)	138
KX-P1123 (24-Pin)	160
KX-P2180 (9-Pin)	155
KX-P2023 (24-Pin) Quiet	198
KX-P2123 (24-Pin) Color Capacity	216
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Graphics Ultra Pro 2MB (PCI)	364
Diamond	
Speed Star Pro 1MB (ISA / VLB)	102
Stealth 24 VLB 1MB	138
Stealth PCI 2MB	238
Stealth Pro VLB 1MB (VRAM)	236
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Level 12 (ISA / VLB)	408
Orchid	
Celsius 1MB / 2MB VLB	188 / 258
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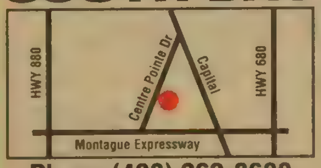

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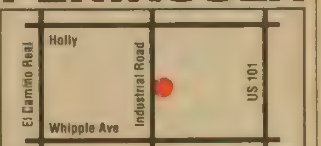

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RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

FEBRUARY

February 5 Star Trek: Federation Of Science Exhibit. San Francisco. California Academy of Sciences. Call: (415)750-7145.

February 5 Symposium And Exhibition On Interactive Television And New Media. San Francisco. New Media World. Call: (415)457-8095.

February 6 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

February 6 The Computer Show & Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)456-6730.

February 7–9 Digital Hollywood: The Media Marketplace Expo. Beverly Hills. Multimedia Development Group. Call: (212)226-4141.

February 8–10 HP/Apollo Workstation Expo '94. San Jose. PCI. Call: 1-800-727-EXPO(3976)or email at workexpo@pcinews.lonestar.org.

February 12 Technical Publications Competition Awards Banquet. Oakland. Society for Technical Communication. Call: (510)466-5464.

February 13 The Computer Show & Sale. Marin Civic Center, San Rafael. MarketPro. Call: (415)456-6730.

February 18–20 The Computer Authority Show. San Francisco. Super Store Expo. Call: (516)499-0646.

February 19 The Computer Show & Sale. Conference Center, San Francisco. MarketPro. Call: (415)456-6730.

February 19 The Computer Show & Sale. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Call: (415)456-6730.

February 19–20 Bay Area Atari Bargain Exhibition South San Francisco. Computer Rock of San Francisco. Call: (415)751-8573.

February 19–20 Computer Show & Sale. Oakland Coliseum. Richard James. Call: 1-800-685-1400.

February 20 The Computer Show & Sale. Scottish Rite Center, Sacramento. MarketPro. Call: (415)456-6730.

February 21–25 Documation '94 Los Angeles. GCA. Call: (703)519-8160.

February 22–23 CASE WORLD/Spring San Francisco. Smith and Smith. Call: (508)470-3880.

February 23–25 WinHEC: The Future Of Windows Hardware. San Jose. Microsoft Corp. Call: 1-800-421-6338.

February 26–27 The Computer Show & Sale. Solano County Fairgrounds, Vallejo. MarketPro. Call: (415)456-6730.

February 27–March 3 Case World And Objex Conference And Exposition. Santa Clara. DCI. Call: (508)470-3880.

February 28 Software World USA: The Advanced Development

Continued

FEBRUARY 5–MAY 1

STAR TREK: FEDERATION OF SCIENCE EXHIBIT

San Francisco

The forty modular displays of the interactive exhibit Star Trek: Federation of Science will show you whether you have the right stuff to explore the future. The exhibit, designed and produced by the Oregon Museum of Science and Industry, comes to the California Academy of Sciences in Golden Gate Park. Visitors can navigate an asteroid field, program a voice-activated computer, turn into a Klingon, "beam down" to an alien planet, even command a starship. Admission is $7 for adults, $4 for youths, students, and seniors. Call: (415)750-7145.

DUE FEBRUARY 15

CALL FOR PAPERS FOR INTERNATIONAL VIRTUAL REALITY AND PERSONS WITH DISABILITIES CONFERENCE

San Francisco

The goal of the "Virtual Reality and Persons With Disabilities" conference is to promote, develop, and commercialize technologies that empower people with disabilities. Sponsors of the conference, the Center on Disabilities at California State University Northridge (CSUN), and the Institute of Electrical and Electronics Engineers (IEEE), have called for papers. Desired topics include policy issues pertaining to virtual reality and disability, access to virtual realty technologies, and virtual reality applications that will benefit persons with disabilities. Submissions are due February 15, 1994. Call: (818)885-2578. Fax: (818)885-4929. Email: vr@vax.csun.edu

THROUGH JUNE 30

ELECTRONIC ARTS SCHOLARSHIP CONTEST

San Mateo

Electronic Arts will award children prizes for dreaming up a great idea for a computer game. The age categories are three to seven years old, and eight to fourteen years old. Grand prize in each age category for the best idea is a $25,000 scholarship. The three runners-up in each age category will receive an EduQuest computer, a library of fourteen edutainment products, and a free FutureKids course respectively. To receive an official entry form, write: Electronic Arts, College Scholarship, 1450 Fashion Island Blvd., San Mateo, CA 94404.

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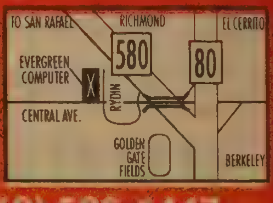

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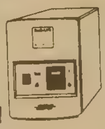

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Barney Bear Goes to School	19
Barney Bear Goes to Space	19
Barron's College Guide	19
Battle Chess Enhanced	19
Beauty and the Beast	19
Bible Library by King James	24
Bibles and Religion	19
Brain Drain	19
Bus & Econ World Atlas	19
Business Background	19
Business Master	19
California Collection	19
Career Opportunities	29
Carmen San Diego Deluxe	19
Chaos and Fractules	29
Chess Maniac	45
Chessmaster 3000 MPC	19
CICA Windows	19
Clip Art Heaven	19
Clipart Goliath	19
Complete Bookshop	19
Composer Quest	24
Consumer Information	29
Cookbook Heaven	19
Cookbook: John Schumacher's	.29
Crossword Craakker	24
Dagger of Ammon Ra	24
Desert Storm	19
Dictionary of the Living World	24
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Dr Games for Windows	19
Dr Games Vol 1	19
Dr Music Vol 1	19
Dr Shareware Vol 1	19
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Dune	24
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Electronic Home Library	24
Electronic Library of Art VI	24
Elvis Karaoke	24
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European Racer by Revell	35
F117A Sealth Fighter	29
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Family Doctor MPC	24
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Font Master II	24
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Game Pak I	19
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King's Quest V	19
King's Quest VI	24
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Library of the Future - 1st	39
LOOM	19
MacMillan Dictionary	24
Manhole	24
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Mantis Experimental Fighter	19
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OS/2 Archives	19
Our Solar System	19
PC SIG 12 Shareware	24
Peter and the Wolf	19
Phoenix 4.0 Shareware	19
Plant Doctor	29
Playing w/Languages - English	19
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Playing w/Languages - German	19
Playing w/Lang. - Japanese	19
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Power Pak Gold	24
Prescription Drugs	29
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Publique Art	29
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Publisher's Paradise	24
Publisher's Power House	24
Rebel Assault	34
Reference Library by STW	19
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Secret Weapon of Luftwaffe	19
Seventh Guest	65
SFX-300 Sound Effects	19
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So Much Shareware III	19
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Space Adventure	19
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Straight From Heaven	19
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STW Grolier's Encyclopedia MPC	24
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Super Fonts	19
Super Games For DOS	15
Super Games for Windows	15
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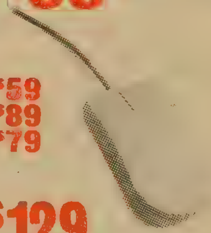

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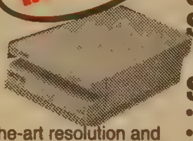

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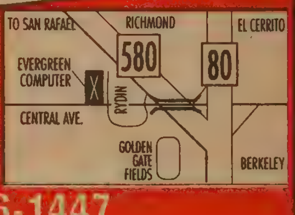

Calendar Of Events continued

Conference And Expo. San Francisco. DCI. Call: (508)470-3880.

February 28–March 2 Objex Conference. San Francisco. DCI. Call: (508)470-0526.

MARCH

March 1–3 1994 Intermedia Conference. San Jose. Stamford Division. Call: (203)352-8445.

March 3–April 14 Next Exit Multimedia Performance. San Francisco. Life on the Water. Call: (415)864-3547.

March 4–April 15 Joe's Digital Diner Interactive Happy Hour And Multimedia Dinner. San Francisco. Life on the Water. Call: (415)864-3547.

March 5–6 Computer Show & Sale. Cow Palace, San Francisco. Richard James. Call: 1-800-685-1400.

March 6 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

March 7–9 Business Issues Surrounding Portable Systems For Computing And Communications Conference. San Jose. Technologic Partners. Call: (212)696-9330.

March 9–10 Portable Systems For Computing And Communications Trade Show. San Jose. Technologic Partners. Call: (212)696-9330.

March 14–18 Business Software Solutions Conference and Exhibition. San Jose. Business Software Solutions. Contact: Business Software Solutions Conference & Expo, 600 Harrison St., San Francisco, CA 94107-9602.

March 14–18 Business Software Solutions, Software Development Conference. San Jose. Smith and Smith. Call: (415)905-2784.

March 16–19 Technology And Persons With Disabilities Conference. Los Angeles. CSU, Northridge Center on Disabilities. Call: (818)885-4929.

March 21–25 UniForum '94. San Francisco. World Expo Corp. Call: 1-800-225-4698.

March 30–April 1 International QuickTime And Multimedia Conference. San Francisco. Sumeria. Call: (415)904-0811.

APRIL

April 3 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

April 5–7 Computer Storage Exposition And Conference. San Francisco. Eberhard & Co. Call: (212)486-6168.

April 19–21 Networks Expo '94 San Francisco. San Francisco. Blenheim. Call: 1-800-829-3976.

MAY

May 1 Computer, Ham Radio, Electronics Swap Meet. Livermore. Livermore Amateur Radio Club. Call: (510)447-3857 or (510)783-8052.

May 2–5 Client/Server Technology Fair. San Jose. Smith and Smith. Call: 1-800-650-4321.

CLASSES, SEMINARS, AND WORKSHOPS

FEBRUARY

February 5 CNE Hands-On Study Group. Oakland. Excel Micro Solutions. Call: (510)836-2040.

February 5 Mac Basics Level 1 Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 5 Overview Of Multimedia Authoring Software Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 5 & March 12 Photoshop Basics Class. Santa Clara. UC Santa Cruz Extension. Call: (408)748-7383.

February 6 The Miraculous Modem: Telecommunications On The Mac For Beginners Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 7 Beginning QuarkXPress Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 7 Intro To Microsoft Word For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 7 Lotus 1-2-3 For DOS Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 7 QuickMail Administrator Level 1 Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 7–8 Intro To Networks Hands-On Workshop. Oakland. Excel Micro Solutions. Call: (510)836-2040.

February 7–9 [20.0]Networking Technologies Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 7–10 Microsoft Windows 3.1 For Support Professionals Class. San Francisco. Infotec Training Institute. Call: 1-800-282-7990.

February 7–10 Principals Of Software Engineering Course. Santa Clara. UC Santa Cruz Extension. Call: (408)748-7383.

February 7–18 Interactive Multimedia Course. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 7–March 7 Photoshop Intensive Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 7–April 18 Digital Photography: Imaging For Multimedia Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 7–May 23 Symbolics Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 8 Claris FileMaker Pro II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 8 Free Increasing Productivity For Professionals Class. San Francisco. Network Services Group. Call: (415)863-8407.

February 8 Intro To DOS 6.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 8 Intro To Excel 5.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 8 Intro To WordPerfect For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 8 Lotus 1-2-3 For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 8 PowerPoint For Windows Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 8 TMS320C4x Design Workshop. San Jose. Texas Instruments. Call: (408)383-2363.

February 8–9 [615]NetWare For Macintosh Connectivity Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 8–9 QuickMail Administrator Level 2 Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 8–10 Intro To AutoCAD Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 8–10 Leadership Dimensions Of Sales And Management Course. Santa Clara. UC Santa Cruz Extension. Call: (408)748-7383.

February 8–15 Photoshop 1 & 2 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 8–March 1 MacroMedia Director Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 9 Advanced FileMaker Pro Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 9 Intro To Excel For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 9 Intro To Word For Windows Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 9 Macintosh Network Administration Class. San Francisco. Cyber

Calendar Of Events continued

Training Services. Call: (415)974-7200.

February 9 PageMaker For Windows Level 1 Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 9 Windows Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 9–10 Intro To Database 4.2 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 9–11 System Administration For Netware Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 9 & 24 Intro To Freelance Graphics For Windows 2.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 9–March 9 Intro To FrameMaker 4.0 Course. Santa Clara. UC Santa Cruz Extension. Call: (408)748-7383.

February 10 Beginning DOS Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 10 E-Mail Privacy & Policy Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 10 Intermediate Excel Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 10 Intermediate Word For Windows Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 10 Intro To Paradox Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 10 Intro To Windows 3.1 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 10 Microsoft Word For Windows Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 10 Microsoft Word II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 10 QuarkXPress Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 10–11 [205]Fundamentals Of Internetwork And Management Design Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 10–11 Intro To Timeline For Windows 5.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 10–11 ISO 9002 Class. Santa Clara. UC Santa Cruz Extension. Call: (408)784-7383.

February 10–11 Microsoft Windows Class. San Jose. Mentor Training. Call: (408)433-0990.

February 10–March 31 Graphic Design For Multimedia On The Mac Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 11 Advanced Macintosh Techniques Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 11 Beginning Persuasion Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 11 Intro To Harvard Graphics 1.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 11 Microsoft Word Print Merge Made Easy Class. San Jose. Mentor Training. Call: (408)433-0990.

February 11 PageMaker I Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 11 Visual Basic Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 11 & 17 Intermediate Lotus 1-2-3 3.4 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 11–18 Director 1 Course. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 11 & 28 Microsoft Excel For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 12 A Business Tour Of The Internet Seminar. San Francisco. Interplay International Telecommunications. Call: (415)621-1908.

February 12 International Human Resources Class. Santa Clara. UC Santa Cruz Extension. Call: (408)784-7379.

February 12 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 12 Multimedia In Sales And Marketing Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 12 QuarkXPress II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 12 Telecommunications: Techniques And Technologies Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 12 & 13 Production Management For Multimedia Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 13 System 7 Workshop. San Francisco. Media Alliance. Call: (415)771-7133.

February 14 Beginning PageMaker Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 14 Harvard Graphics For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 14 Intermediate Access For Windows 1.1 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 14 Intermediate Paradox 1.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 14 Intro To Excel 4.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 14 Intro To Mac Networks Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 14 Intro To Word For Windows 6.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 14 WordPerfect/DOS Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 14–15 Data Communication And Networking Seminar. San Francisco. Center for Advanced Professional Development. Call: (714)261-0240.

February 14 & 16 [526]NetWare v3.11 To 4.0 Update Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 14–18 Managing Microsoft Windows NT Advanced Server Class. San Francisco. Infotec Training Institute. Call: 1-800-282-7990.

February 15 Adobe Illustrator Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 15 Aldus Persuasion For Windows Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 15 Beginning Microsoft Word Class. San Francisco. Cyber Training

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•Arthur's Teachers Trouble (MPC)	18
•Carmen San Diego Deluxe	18
•CD Deluxe Pak	21
•Dinosaurs & Space Aventure (MPC)	25
•Groliers Encyclopedia (MPC)	31
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Promise 4030 VL-II VLB (Exp to 16 MB)	125
Adaptec 1542 CK SCSI w/Kit	240
Adaptec 2742 EISA SCSI	325

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Fax Modem (14400 Fax, 14400 Modem)	115

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Orchid Celsius SVGA, 1 MB VRAM, VLB	205
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Diamond Viper 2 MB VRAM, VLB Accelerator	360

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Logitech MouseMan	35
Logitech Trackman	72
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Mid/Full Tower Case w/PS	75/99
Colorado Tape Back-Up 250 MB	150
486 CPU Cooling Fan	9
Speakers 80 Watts	65
Speakers 25 Watts	45
RAMs, SIMMs, Others	CALL

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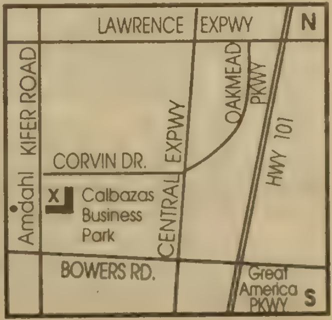

Calendar Of Events continued

Services. Call: (415)974-7200.

February 15 Build And Upgrade An IBM PC Clone Workshop. Oakland. Excel Micro Solutions. Call: (510)836-2040.

February 15 Free $79 Network Class. San Francisco. Network Services Group. Call: (415)863-8407.

February 15 Intermediate Access For Windows 1.1 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 15 Intermediate Lotus 1-2-3 Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 15 Intermediate Quattro Pro 5.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 15 Intro To Networking Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 15 Microsoft Excel Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 15 TMS320C5x Design Workshop. San Jose. Texas Instruments. Call: (408)383-2363.

February 15–16 Authorware Basics Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 15–16 [650]NetWare TCP/IP Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 15–16 Photocentric Photoshop Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 15 & 17 Beginning Excel Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 15–18 Intermediate AutoCAD Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 15 & 22 FileMaker Pro Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 15 & 22 Lotus 1-2-3 For DOS Level 1 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 16 AutoCAD R13 Demonstration. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 16 Basic Lotus Notes Concepts Class. Santa Clara. Infotec Training Institute. Call: 1-800-282-7990.

February 16 Intermediate Programmer's Object PAL Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 16 Intermediate Word For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 16 Paradox For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 16 Quattro Pro/Windows Level 1 Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 16–18 Intro To Timeline For Dos 5.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 16 & 23 FrameMaker Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 16 & 23 Microsoft PowerPoint Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 16 & 23 Microsoft Word Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 16 & 23 Paradox For DOS Level 1 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 16 & 23 QuarkXPress 3.1 Level 1 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 16–March 2 Apple Media Tool Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 17 Advanced Illustrator Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 17 Becoming A Freelance Technical Writer Class. Palo Alto. Society for Technical Communication. Call: (415)589-3353.

February 17 Intermediate Microsoft Word Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 17 Intermediate Paradox Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 17 Intro To Harvard Graphics 3.0/3.5 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 17 Microsoft Access Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 17 OpenVision: Challenges In Merging Disparate Software Organizations Class. Palo Alto. MIT Enterprise Forum of the Bay Area. Call: (415)329-0510.

February 17–18 [610]NetWare NFS Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 17–18 [804]NetWare 4.0 Installation Workshop Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 17–18 Quark Project Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 17–March 3 Aldus PageMaker Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 18 Advanced DOS Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 18 Advanced PageMaker Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 18 Intermediate WordPerfect For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 18 Intro To Freelance Graphics For Windows 2.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 18 Intro To WordPerfect 5.1 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 18 Microsoft Excel For Windows Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 18 PageMaker II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 18 & 25 Microsoft Excel Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 19 Credibility: How To Earn It, How To Keep It Class. Santa Clara. UC Santa Cruz Extension. Call: (408)784-7379.

February 21 Basic Lotus Notes Concepts Class. San Francisco. Infotec Training Institute. Call: 1-800-282-7990.

February 21 Free $79 Network Class. San Francisco. Network Services Group. Call: (415)863-8407.

February 21 Free Basics Of Unix Class. San Francisco. Network Services Group. Call: (415)863-8407.

February 21 Lotus Notes System Administration I Class. Santa Clara. Infotec Training Institute. Call: 1-800-282-7990.

February 21 MacProject Pro Class. San

Continued on page 300

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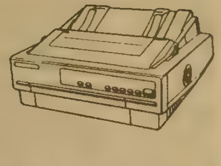

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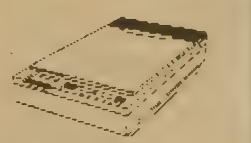

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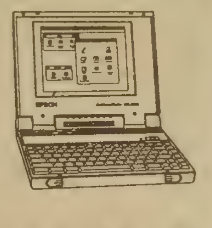

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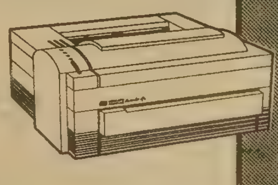

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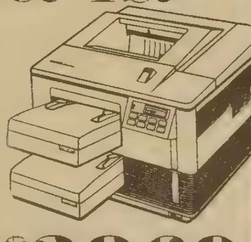

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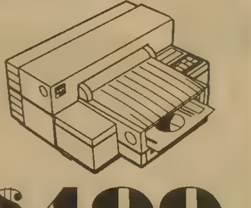

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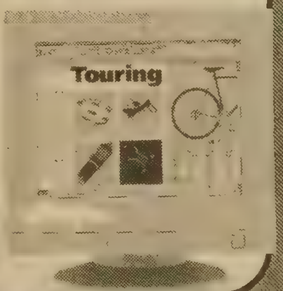

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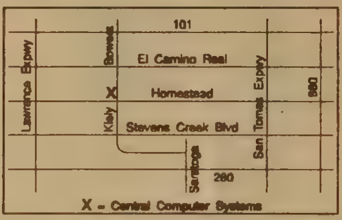

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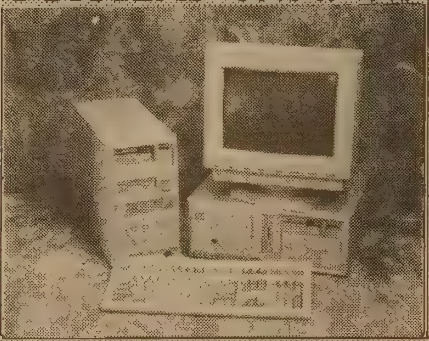

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Mitsumi 101 Keyboard
MS Serial Mouse
MS DOS 6.0 & Windows 3.1
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486 DX-33 EISA 256K VLB	1219
486 DX2-66 ISA 256K VLB	1219
486 DX-33 ISA 256K VLB	1029

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IDE Controller, 2S 1P
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Mitsumi 101 Keyboard
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HARDWARE

1. CD ROM & SOUND CARD

CREATIVE LAB

CD 531 w. Kit Ext	199
Discovery CD 16 Int	459
Edutainment CD 16 Int	479
Midi Kit	59
Sound Blaster Pro Multimedia Kit Ext	429
Sound Blaster Pro Deluxe	109
Sound Blaster 16	155
Sound Blaster 16 Basic	129
Sound Blaster 16 MCD	158
Sound Blaster 16 SCSI ASP	205
Video Blaster	315
Video Spigot for Windows	345
Voice Blaster	75
Wave Blaster	189

LOGITECH

Soundman 16	99

MEDIA VISION

Fusion Double CD 16	485
Midi Mate	49
- w. Passport Design Trax	89
Multimedia Upgrade Kit w. Spectrum 16	625
Pro 16 Multimedia System II Int	755
Pro Audio Spectrum 16	129
Pro Audio Studio 16	159
Pro Movie Spectrum	285
Pro Movie Studio	335

MITSUMI

FX-001D 250ms Double speed w. Kit	188

NEC

3XI 190ms, 450Kb/s, Triple speed Int	499
3XE 190ms, 450Kb/s, Triple speed Ext	599
Interface Kit for PC	79
Multimedia Upgrade Kit Int / Ext	695/745

PANASONIC

562 320ms, 300Kb/s, Int	199
- with controller	219

TEXEL

DM-3028 240ms, Int	269
- with controller	314
DM-5028 240ms, Ext	379
- with controller	424
Driver Kit for Media Vision Int / Ext	19/59

TOSHIBA

3401B 200ms, 330Kb/s, Int	335
- with controller	380
3401E 200ms, 330Kb/s, Ext	429
- with original Toshiba Case	459
Driver Kit for Media Vision Int / Ext	19/59

TRANTOR

T130 SCSI Interface Kit (w/o cable)	45

OTHERS

CD Caddy	5.25
Speakers :	
Active 75 Speakers	69
Active B789 120W Speakers	79
Altec ACS50 Speaker Systems	75
Koss Amplified Mini Speakers w. Equalizer	45
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Labtec Speakers CS150	25
Sound Card :	
Cardinal Digitial Sound Pro 16	125
Gravis Ultrasound	139
Turtle Beach 16 Multisound	415

*(price) .... special

2. CASE

Baby AT w. 200W Power	69
Baby Tower w. 200W Power	69
Mid Tower w. 230W Power	79
Mid Tower w. 250W Power: Black / White	139/129
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Full Tower w. 300W Power: Black / White	199/189
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- 1 half ht or SCSI for Mac, 40W, w. cables	79
- 2 half ht or 1 full ht for PC, 60W	99
- 2 half ht or 1 full ht for Mac, 60W, w. cables	125
- 3 half ht or 1 full & 1 half ht for PC, 60W	119
- 3 half ht or 1 full & 1 half ht for Mac, w.cables	145

3. CONTROLLER

ACCULOGIC

sIDE-4 Plus 2FD & 2HD, 2S 1P	39

ADAPTEC

1522A Fast SCSI w. Kit, 3Mb/s	155
1542CF SCSI 10Mb/s	199
- 1542CF w. Kit	249
1542C Plus w. ASW 500	299
2742T SCSI EISA w. Kit	395
2842VL SCSI VLB w. Kit	299
ASW-1440 ASPI Netware Manager v3.3	69
ASW-310 Sy-Tos Plus (tape backup s/w)	99
ASW-EZ SCSI for Dos & Windows	69

AMI

FastDisk SCSI EISA (cache up to 16MB)	399

BUSLOGIC

BLI-KT 542B SCSI-2 w. Kit	199
BLI-KT 545S Fast SCSI-2 w. Kit, 10Mb/s	209
BLI-KT 747S Fast SCSI-2 EISA w. Kit	365
BLI-BT 445S SCSI VLB w. Kit	275

DTC

3280SAS SCSI	105

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TMC-1660 for AT (HD only)	119
TMC-1660 SVP	135
TMC-1680 for AT, 15Mb/s, (4F&H)	129
TMC-1680 SVP (SCSI Value Pack)	155

KOUWELL

IDE Controller only	27
IDE w. AT I/O (2S 1P 1G)	34
IDE w. AT I/O (2S 1P 1G) w. 16550 chips	59
IDE w. AT I/O (2S 1P) VLB	49
IDE w. AT I/O (2S 1P) VLB w. 16550 chips	69

MYLEX

DCE 376 SCSI EISA	550

PROMISE (Drive Cache)

DC-200 IDE cache up to 16MB	95
DC-2040 SCSI cache up to 16MB	179
- Bios Chips & CD Driver	39
DC-420 IDE VLB w. 512k cache up to 1MB	109
DC-4030VL IDE VLB cache up to 16MB	125

ULTRASTOR (w/o cable)

ULT14F ISA SCSI w. 32k cache	199
ULT34F SCSI-2 VLB w. 32k cache	275

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IDE w. 4FD/ 3S 2P 1G/ 2S16550 chips	69
SCSI w. CD Rom drivers	49
VL2000 IDE VLB w. AT I/O	45
VL2018 IDE VLB w. 2HD/ 4FD/ 2S 1P/ 16550 chips/ 2.88MB	69

OTHERS

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IDE w. I/O (2S 1P) for ISA	19.50
IDE w. I/O (2S 1P) for VLB	49

4. CPU & MATH CO

CPU :

AMD

386 DX-40	59

INTEL

386 DX-25	69
386 DX-33	69
486 DX-33	275
486 DX-50	425
486 DX2-50	315
486 DX2-66	465
Pentium 586-66	875

Math Co Processor :

CYRIX

83D86 - 33	69
83D87 - 40	69
Cx486 DLC TI-33	75
Cx486 DLC TI-40	85

INTEL

387 DX	85
387 SX	79

OTHERS

Cooling Fan (heat sink)	12
TRANS ERA Make-It-486 (for 386 machines)	239

5. DIGITIZER

SUMMASKETCH

III 12 x 12, 4 or 16 button	269
III 12 x 18, 4 or 16 button	549

WACOM

SD-510C 6 x 9, w. Pressure Stylus	459
SD-420E 12 x 12, w. Pressure Stylus	655
- w. Painter 2.0 software	699
SD-421E 12 x 12, Electrostatic w. Stylus	745

6. DRIVE

HARD DRIVES :

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CP-30254H 250MB 14ms 32k IDE 1" ht	219
CFA-340A 340MB IDE	259
CP-30544 544MB 12ms IDE 1" ht	449

FUJITSU (5 yr. warranty fr.Fujitsu)

2624FA 520MB 12ms SCSI-1 & 2	535
M2694ESA 1.0GB 10ms SCSI-2 3.5" 1/2 ht	865
M2654S 2.1GB 12ms SCSI-2 5.25" full ht	1445

MAXTOR

MXT-7131A 130MB 15ms IDE 3.5"	179
MXT-7213A 213MB 15ms IDE 3.5"	209
LXT-7345A 345MB 14ms IDE 3.5"	269
MXT-7345S 345MB 15ms SCSI 1" ht	345
MXT-540A 540MB 8.5ms IDE 1" ht	439
MXT-540SL 540MB 8.5ms SCSI-2 1" ht	585
MXT-1240S 1.2GB 8.5ms SCSI-2 3.5"	1195
Optical Rewritable 1GB 35ms SCSI, 4MB Ext Tahiti IIM / 1GB Cartridge Glass	2495/195

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LPS-540AT 540MB 12ms 128k IDE	439
LPS-540S 540MB 12ms 128k SCSI	499
PRO-700S 700MB 10ms 512k SCSI-2	745
PRO-1225S 1.2GB 9ms 1.2M cache SCSI	955

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1.2 / 1.44 (use printer port)	175

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105MB 5.25" w. cartridge for Mac,Ext,SCSI	475
105MB 3.5" w. cart. & SCSI cont. for PC,Int	379
105MB 3.5" w. cart., printer port for PC, Ext	429
105MB 3.5" w. cart., IDE host adapter	355

TEAC

1.2MB 5.25"	48
1.44MB 3.5" w. frame	42
2.88MB 3.5" w. frame	85
Dual - 1.2MB & 1.44MB	105

OTHERS

Mounting Frame for 3.5" Hard / Floppy Drive	6
Removable Case for 3.5" IDE HD	39

7. I/O CARD

BOCA

Bocaboard w. cable 4 / 8 / 16 port	99/149/299

KOUWELL

AT I/O (2S 1P)	27
AT I/O (2S 2P)	33
AT I/O (2S 1P 1G)	27
AT I/O (2S 1P 1G) w. NS16550 chips	49
AT I/O (2S 1P 1G) w. IDE controller	34
4 Serial Ports	65
Printer Card (2P)	15
Serial Card (XT, AT)	15

QUICKPATH

13 Port I/O w. 4-16550UARTs + Extd. IRQs (2IDE, 4F, 4S, 2P, 1G)	125
4 Serial, 16550UARTs, 8addr, 10IRQs (3,4,5,7,9,10,11,12,14,15)	99

SIIG

(2S 1P) w. 16550 chipset	49

STB 4-COM

4 Serial, 16 bit, w. 16554, support Com 1-8, IRQ (2,3,4,5,10,11,12,15)	109

WONDER SYSTEMS

(4S 3P) 16 bit, 16550FIFO, 8IRQ	135

8. KEYBOARD

ANCER (black)

101 Key	42

FOCUS

FK2001 101 Click	42
FK9000 129 Key Programmable	65

NORTHGATE OMNI

101NI	69
101S	55
102	69
Ultra T	95
Ultra F	95

SIIG

Suntouch 101 Click	49
Suntouch Jr. 84 Key Mini	45

OTHERS

BTC 84 Key Mini	37
Keycat II 101 w. trackball mouse	65
Keytronic 101	37
Maxi 101	35
Maxi Key 124	59
Mitsumi 101	30
New Maxi	29
PT505C 101	25

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9. MEMORY

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MB x 1 - 80ns	6.20
4K x 1 - 100ns	1.39
4K x 4 - 80ns	1.65
56K x 1 - 80ns	1.39
56K x 4 - 80ns	5.30

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MB x 9 - 60ns / 70ns (3 chips)	38.50/37.50
MB x 9 - 80ns (3 chips)	37
MB x 9 - 60ns / 70ns	call
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56K x 9 - 70ns / 80ns	14/13
MB x 36 - 60ns / 70ns	195/185
MB x 36 - 60ns / 70ns	659/649
imm Mac: 4MB x 8 - 70ns / 80ns	155/145

IPP

MB x 9 - 70ns (3 chips)	43

OMPUTER MEMORY (3rd Party)

BM	
or PS/2 50Z/ 55SX/ 65SX/ 70	
2MB / 4MB	95/159
or PS/2 80-111/ 311/ 121/ 321 - 4MB	225
or PS/2 80-A21/ A31/ A6 - 4MB	279
ompaq	
or Deskpro 386N/ 386SX20	
2MB / 4MB / 8MB	109/159/319
or Deskpro 386-20e/ 20/ 25e	
1MB / 4MB	95/185
or Deskpro 486M	
2MB / 4MB / 8MB	109/159/319
or LTE 286 - 2MB / 4MB	129/195
or LTE 386S-20 - 1MB / 4MB	89/209
or SLT 286 - 1MB / 4MB	99/259
or Prolinea 386-25ZS/ 25S	
2MB / 8MB	105/375
or ProLinea 486-33/ 50/ 25S	
2MB / 4MB / 16MB	95/199/699

INGSTON MEMORY

urrent price	call

APTOP / NOTEBOOK (3rd Party)

AST for Exec - 4MB	155
Compaq	
or Contura - 2MB / 4MB / 8MB	105/165/295
or LTE-Lite 20/ 25/ 25C	
4MB / 8MB	215/349
BM	
or L40SX/ N33SX - 4MB / 8MB	169/319
MAC	
or Powerbook 140/ 170	
2MB / 4MB	135/179
NEC	
or Ultralite III-SL25C/ SX20	
4MB / 8MB	239/399
Packard Bell	
for 386SX - 2MB / 4MB	155/259
Panasonic	
for 170/ 270/ 370 - 1MB	79
Toshiba	
for T1600 - 2MB	139
for T2200SX - 4MB / 8MB	179/299
for T3100SX - 2MB / 4MB	129/187
for T3200 - 3MB	209
for T3200SX - 2MB / 4MB	129/199
for T5100 - 2MB	139
for T5200/ T8500- 2MB / 8MB	129/369

ASER PRINTER MEMORY UPGRADE

JET RAM (3rd party) :

Epson	
for EPL6000 - 2MB / 4MB	114/175
HP	
for Desk Jet 500/500C - 256k	75
for Laser Jet II/ IID	
-1MB / 2MB / 4MB	99/145/235
for Laser Jet III/ IIIP/ IIID	
- 1MB / 2MB / 3MB / 4MB	79/125/169/215
for Laser Jet 4/ 4M	
- 4MB / 8MB / 16MB	199/389/699
Panasonic	
for KX-P4410/ 4430	
- 1MB / 2MB / 4MB	95/139/229
for KX-P4420/ 4450i	
- 1MB / 2MB / 4MB	99/145/235
for KX-P4450 - 1MB	139
for KX-P4455 - 2MB	169
for KX-P4400/ 5400 - 2MB	185
QMS	
for PS410 - 1MB / 2MB / 4MB	99/145/235
for PS815/ 825 - 2MB / 4MB	159/249
Texas Instruments	
for Micro Writer - 1MB	69
for Micro Laser Turbo XL - 1MB	69

PACIFIC DATA :

Pacific 4 for HP IIP+/ IIIP/ III/ IIID	
- 1MB / 2MB / 4MB	89/135/225
1-2-4 Plus for HP II/ IID	
- 1MB / 2MB / 4MB	115/159/249
Pacific 4 SIMM for HP 4/ IIISi/ XL300	
- 4MB / 8MB	189/375
for ProTracer - 5MB / 8MB	375/525

*(price)	special

10. MODEMS & FAX

BOCA

14.4 Fax modem Int / Ext	125/155

E-TECH

Uformate Pocket Fax modem (w. Win/Dos s/w)	
- P9696MX	159
- P1496MX	189
- P1414MX (distinguish ring & called ID)	225

GVC

14.4 Fax modem Int / Ext	129/149
PCMCIA 144 Fax	145

HAYES

Accura 2400 Int / Ext	65/75
Accura 96 + Fax Int / Ext	199/229
Accura 144 + Fax Int / Ext	215/245
Optima 144/144 Fax modem Ext	389
PCMCIA Optima 144 Fax	325
Pocket Edition 2400 w. Smartcom EZ	129
SmartCom for Windows	47
V-Series Smartmodem 9600 v.42, MNP5 Ext	499

INTEL

Faxability Plus/OCR for Windows 2.0	85
New Fax modem 24/96 Int	55
New Fax modem 24V/96 v.42bis Int / Ext	119/129
New Fax modem 96 Int / Ext	145/165
New Fax modem 144 Int / Ext	159/179
PCMCIA 144 Fax modem	*(295)315
SatisFAXtion modem w. Faxability software	
- 100 send96 rec.48, 2400 modem Int	99
- 200 96/24 v.42, MNP5 Int	245
- 400 144/144 v.42, v.32bis, MNP5 Int	279
- 400e 96/144 4k data buffer Ext	*(299)325

MEGAHERTZ

PCMCIA 96/24 Fax modem w. X-Jack	225
PCMCIA 144 Fax modem / w. X-Jack	325/345
P2144 Pocket 144/144	325

MICROCOM

Microporte 4232bis Fax modem	465
QX 4232bis / QX4232bis + modem	455/565

PRACTICAL PERIPHERALS

Fax Me (turn HP laser to fax receiving)	129
Mini Tower 144FX144 Ext	*(195)
PM144FX144 Int	*(175)
Pocket 144 Fax modem	369
PM2400 Fax modem	89

SHIVA

Net modem/E Ethernet BNC/TP	1475

SIIG

TeleCommunicator 10-in-1 Fax modem	229

US ROBOTICS

Courier 16.8 Int / w. Fax	459/499
Courier 16.8 Ext / w. Fax	495/545
Courier v32 Terbo Fax 19.2MB w. ASL	*(425)
Sportster 144/144 Fax MNP5 Int / Ext	149/169
Sportster 144/144 for Mac Ext	199

ZOLTRIX

2400 baud modem, MNP5 Int	39
96/24 send & rec Fax modem MNP5 Int	69
96/24 Fax modem v.42, MNP5 Int	85

ZOOM

AFC Int / AFX Ext	55/69
96/24 w. WinFax Lite Int / Ext	75/79
96/96 w. WinFax Lite Int / Ext	135/165
144/144 w. WinFax Lite Int / Ext	149/179

ZY-XEL

U1496B 16.8 voice 14.4 Fax w. Win s/w Int	315
U1496+ upgradable to 19.2Kbps Int	425
U1496E 16.8 voice 14.4 Fax, LED Ext	319
U1496E+ upgradable to 19.2Kbps Ext	429

12. MONITORS

EMC

EM1412 14" Mono Amber, 90-260v	95
EM1417 14" 1024 x 768 VGA Mono Paper White	119
EM1428 14" 1024 x768 .28, 90-260v	259
EM1430K 14" 1024 x 768 .28, NI	279
EM1439G 14" 1024 x 768 .39	219

HITACHI

CM2095 20" 1280 x 1024 .31 w/o cable	1325
CM2187 21" 1600 x 1280 .31 w/o cable	2045
Accuvue PS20 20" 1600 x 1280 .28	1695
Accuvue PS21AM 21" 1600 x 1280 .28	2395

MAG (auto switch power)

MX15F MPRII 15" Flat 1280 x 1024 .28, NI	495
MX17F MPRII 17" Flat 1280 x 1024 .28. NI	915
MX17FG 17" Flat 1280 x 1024 .26, NI	945
Mac Adapter	25

MITSUBISHI

HL6955SETK 20" 1280 x 1024 .31, NI	1745
TFS6705 Diamond Pro 17" 1280 x 1024 .26, NI, Tinitron, MacII, 100-240V	1045
BNC Cable	39

NANAO (call for rebate info.)

F340iW 15" Full Flat Screen 1024 x 768 .28	545
F550iW 17" 1280 x 1024 .28, NI, Mac	1095
F560iW 17" 1280 x 1024 .26, NI	1325
F550i 17" 1280 x 1024 .28, NI, Mac	955
T560i 17" 1280 x 1024 .25, NI, MacII	1635
T660i 20" 1280 x 1024 .31, NI, Trin., MacII.	2395
F760iW 21" 1280 x 1024 .31, NI	2075
F780iW 21" 1600 x 1280 .26, NI	3195

NEC (120V)

3FGe 15" 1024 x 768 .28, Mac	589
3V 15" 1024 x 768 / w. rebate	529/479
4FGe 15" Flat 1024 x 768 .28, NI, Mac	689
5FGe 17" 1024x768 .28, NI (no accu color)	1125
5FGp 17" 1280 x 1024	1295
6FG 21" Flat 1280 x 1024 .28, Mac	2295
6FGp 21" 1280 x 1024	2399
NEC Monitor Lens : Anti-reflection, Anti-satic for 4FG / 5FG / 6FG	*(59)/*(99)/185
FG/MacII Cable Adapter Kit	19.50

NOKIA

447B 17" 1280 x 1024 .25 / TCO	1025/1179
445M 21" 1600 x 1280 .26 / TCO	2099/2299
445X 21" 1600 x 1280 .26	2699

PROTON

PM1561A 15" 1280 x 1024 w. speakers built-in	415

SAMSUNG

CSK557L 15" 1024 x 768 .28, NI	445

SEIKO (90-132V)

CM2050 20" 1024 x 768 .31, NI, Mac	1395

SIIG

9" VGA Mono Paper White 640 x 480	135

SONY

1430S 14" 1024 x 768 .25, NI, 120V	529
17SE 17" 1600 x 1280 .25	1175
1730 17" 1024 x 768 .25, NI	995
2038 20" 1280 x 1024 .30, NI	2195

Standard Technologies

400-M 14" VGA Paper White	119
428-VESA 14" 1280 x 1024 .28, NI	279

VIEWSONIC

4e 14" 1024 x 768 .28, 110/220V	279
5+ 14" 1024 x 768 .25, NI, MacII	475
6e 14" 1024 x 768 .28, NI	299
14e 14" 1024 x 768 .28, NI, MPRII	349
15 15" 1280 x 1024 .28, NI, MacII	449
17 17" 1600 x 1280 .27, NI, MacII	995
17G 17" 1280 x 1024 .28, NI	875
20 20" 1600 x 1280 .28, NI, MacII	1575
21 21" 1600 x 1280 .26, NI, MacII	1825
Mac Cable Adapter	35

OTHERS

Monitor Power Saver	39
Telepower w. Monitor power saver	59

13. MOTHERBOARD

AIR (w/o cpu)

486-33 / DX2-66 256k, 3VLB slots	215
486-33 / DX2-66 256k EISA, 3VLB slots	425

AMI

Super Voyager II 486-33 256k VLB, 7 slots	645
Super Voyager II 486-DX2-66 VLB, 7 slots	865
Enterprise III 486-33 256k EISA VLB	875
Enterprise III 486-DX2-66 EISA VLB	1095
Enterprise IV 486-33 256k EISA VLB	769
Enterprise IV 486-DX2-66 256k EISA VLB	999
Pentium 256k ISA VLB, IDE I/O built-in	535
PCI 586 256k EISA, Fast-wide SCSI built-in.	735

ALARIS (IBM)

486SLC2-66 64k VLB w. CPU & Math Proc..	319

IBM

486SLC-33 / 66 16k Internal cache ISA v.2 w. CPU & Math Processor	265

LYNX (USA made)

486-33 / 50 / DX2-66 256k VLB	149

MICRONICS

386SX-20 Phoenix BIOS, 32MB max	175
386-33 64k Gemini, 32MB max	299
486-33 256k VLB	615
486-DX2-50 256k VLB	695
486-DX2-66 256k VLB	825
JX30 486-DX2-66 256k VLB w. Zif socket	895
486-33 256k EISA VLB	845
486-DX2-66 256k EISA E2	995
486-DX2-66 256k EISA VLB	1045
PCI 586-60 256k, 3PCI slots	1645

NICE (w/o cpu)

486-33 / DX2-66 256k VLB	215
486-50 / DX2-66 256k Mini EISA VLB	265
486-50 / DX2-66 256k EISA VLB	425
Pentium VL / w. Flash	495/535

QUICKPATH

486-50 64k 15ns ISA, w/o cpu	195

OTHERS

386-40 128k w. CPU / w/o cpu	159/109
486-33 128k ISA w/o cpu	125
486-33 256k ISA w/o cpu	139

14. MOUSE & JOYSTICK

AGILER

AGM-600E Serial 400dpi	23.50
ATB-610 Serial Trackball	24.50
Keen	12.50

ANCER (black)

3-button	22

APPOINT (portable)

MousePen Pro	49
Thumbelina	49

KENSINGTON

Bus 4.0	119
Expert Serial & Trackball 4.0	99

LOGITECH

Cordless II	75
Cyberman 3D Controller	75
Dexxa Serial	24
First Serial	37
Fotoman Plus Camera for PC & PS/2	519
Mouseman Bus	59
Mouseman Serial	54
Trackman Portable	79
Trackman II	75

MICROSOFT

Ball Point Portable	119
Bus 2.0 (oem) / w. Bus Card	46/69
Bus 2.0 w. Expansion Card	89
Mouse 2.0 + Windows 3.1	149
Serial 2.0 (oem)	45
Serial 2.0 w. PS/2 Port	*(65)
Serial 2.0 w. 9 to 25 pin Adapter	*(59)

MOUSE SYSTEMS

Little Mouse PC Serial (2-button optical)	29
New Point (trackball for laptop & PC)	39
Omni (2-button, MS compatible)	25
PC Mouse (3-button optical)	*(45)
PC Trackball II	49
Serial Bus Card (9IRQs)	29
The New Mouse 400dpi (3-button)	39

JOYSTICK :

THRUSTMASTER

ACM Gamecard	29
Flight Control System / Pro	68/114
Flight Stand Holder	19
Rudder Control	115
Weapon Control MKII	*(99)

OTHERS

Adapter Kit	16.50
Gravis Game Pad	23
Warrior 5, Quick Shot	14.50

15. NETWORK

3COM

3C503 8 bit coax / TP	179/199
3C503 Etherlink II 16 bit coax / TP	169/179
3C507 16 bit Ethernet coax / TP	289/299
3C509 Etherlink III coax / 5 pack	125/555
3C509 Etherlink III TP / 5 pack	122/545
3C509 Combo / 5 pack	145/595
3C529 Etherlink III for MCA / TP	245/249
3C551 Link Watch SNMP/NLM software	259
3C579 Etherlink III EISA coax / TP	235/239
3C621 Link Builder 10BT, 12 Port HUB	699
3C16270 Link Builder TP, 12 Port HUB	395
TokenLink III 16/4 ISA / MCA / EISA	435/495/645

ADDTRON (Novell compatible)

AE-200JL Jumperless BNC & TP	69
AE-200LB 8 or 16 bit BNC only	59
AE-200LC 8 or 16 bit BNC & TP	65
AE-200LT 8 or 16 bit TP only	59
Arcnet: Arc120TP 8 bit Combo	59
Arcnet: Arc220TP 16 bit Combo	69
Arcnet: 8 Port Active HUB coax / TP	135/145
ET-200STS NE2000 coax compatitble	65
Boot PROM 16 bit	15
HUB: UTP8 (8TP + 1BNC)	215
HUB: UTP16 (16TP + 1BNC + 1AUI)	450
Pocket Adapter: BNC / TP	125/129
Starter Kit for Novell Lite 1.1 / for Win	245/265
Starter Kit for Lantastic AI Dos / Win	285/295

Transceivers: ET10TB (TP<-->AUI)	45
Transceivers: ET10CB (BNC<--> AUI)	45

ALLIED TELESIS (CentreCOM)

AT-1500T / AT1700T (TP)	79/79
AT-1500BT / AT-1700BT (BNC + TP)	99/99
Transceivers: MX10 / 210T	45/45

ARTISOFT (Lantastic)

AE-2 Ethernet Adapter	195
AE-2 Ethernet Starter Kit 5.0 Dos / Win	449/509
AE-3 Ethernet Adapter	225
AE-2/T 16 bit 10BaseT Adapter	199
AI Software 5.0 Dos / 6 pk / 12pk	82/450/795
AI Software 5.0 Win / 6 pk / 12pk	87/475/845
Articom LAN Modem Sharing Software	279
2Mbps Starter Kit Dos / Win	355/415
2Mbps 1-user Kit Dos / for MCA	139/215
64k Ram upgrade for AE-2, AE-3 Adapter	45
Central Station II	399
Ethernet s/w Kit 5.0 w. cable Dos / Win	79/139
Lantastic Z 5.0 (2 stations)	*(69)89
Lantastic for Netware v1.0 / v5.0	99/275
Lantastic for Mac Software Kit	339
Lantastic for TCP/IP single / 5-user	185/760
Lantastic Print Server Stationware	69
Network Eye - Remote Control Access	155
NR2000A	225
NR2000C BNC only	172
NR2000C Starter Kit Win	469
NR2000T RJ45 only single / 6 pk	175/979
NR2000 MCA	255
NR-SI 2000C / 2000T	*(85)/*(95)
NR-SI 2000C AI Starter Kit Dos / Win	*(299)
NR-SI 2000A Combo	129
NR-SI 2000M	165
Peer-HUB 10BaseT Concentrator	270
Remote Boot ROM for AE-2, AE-3, NR2000	45
Sounding Board Adapter Kit	69
Stationware (dial up connector)	69
T-Runner 6 Port HUB	320
T-Runner 12 Port HUB	520

ASANTE

AH Intelligent HUB 12 Port	875
10T HUB 8 Port / 12 Port	255/495
FriendlyNet with AUI / BNC / TP	69

CASTELLE

JetPress (network print server) for HP II, IID, III, IIID, coax / TP	429
LANPress (print server connects up to 4 printers)	
- Ethernet Thick/Thin coax (1P 3S)	475
- Ethernet Thick/Thin coax (2P 2S)	625
- Ethernet 10BaseT (1P 3S)	475
- Ethernet 10BaseT (2S 2P)	635

CC:MAIL

cc:Mail Dos Platform 4.0	199
cc:Mail Win Platform 2.0	335
cc:Mail 10-user pk / 25-user pk	239/579
cc:Mail Fax 1.2	1350
cc:Mail Gateway 3.21	859
cc:Mail Remote	199
cc:Mail Router 4.0	875

DCA

Crosstalk 2.0	119
Commuicator	58
IRMA Workstation Dos / Win	225/359
IRMA 3270 for MacII/ LC/ SE	695

D-LINK

DE-205 TP : 4 Port HUB + 16 bit Card	295
DE-220 TP 8 or 16 bit	*(99)
DE-600 Pocket Adapter coax / TP	215/215
DE-650 PCMCIA coax / TP	195/199

FARALLON

PN381 PhoneNet w. Timbuktu for Win	259

GATEWAY COMMUNICATION

G/Ethernet 16 coax / 32 bit	59/*(199)

IBM

Ether 16 coax / TP / Combo	89/85/95
PCMCIA for Token Ring 16/4	479
PCMCIA 10B2 / 10BT	215/195

INTEL

EtherExpress Flash LAN Combo / 5 pk	*(135)/625
EtherExpress 16 coax / 5 pk	*(115)/495
EtherExpress 16 TP / 5 pk	*(117)/499
EtherExpress 16 MCA / 16 MCA TP	175/185
EtherExpress 32 EISA	439
Flash 32 EISA	249
HUB: 12 Port EtherExpress ISA / EISA	565/645
LAN Protect 1.5 (virus protection)	685
LAN Sight 3.0 Netware Utility / Monitor	299
LAN Spool s/w 386 NLM v3.5A	425
Netport II Thin & Thick / 10BT	395/399
Netport Express XL	465
NetSatisfaxtion v2.5 for Novell	955
TokenExpress 16/4 ISA/ EISA/ MCA	435/655/475

LANPRO

HUB ER5390 : 8 Port (8TP + 1BNC)	189
HUB ER5396 : 16 Port (16TP + 2BNC)	359

*(price)	special

NOVELL (Eagle)

EPROM for NE2000	35
EP2000 coax / TP	99/89
Microdyne NE2000 5 pk	499
NE2000 Plus Ethernet coax / 5 pk	119/525
NE2000T Plus Ethernet TP / 5 pk	105/475
NE2000 Netware Lite Starter Kit / Win	355/375
NE2000 Plus Combo / 5 pk	135/550
NE3200 Eagle EISA w. TPA	545
NE3210 EISA 32 bit Combo (ws)	215
Netware Lite 1.1 + DR Dos 6.0	65
Netware Lite w. Win Utilities	75
Netware 3.12	
- 5 / 10 / 25-user	625/1395/2095
- 50 / 100 / 250-user	2695/3995/6995
Netware 4.01	
- 5 / 10 / 25-user	825/1825/2625
- 50 / 100 / 250-user	3595/5495/9695
NPE 400 Print Server	350
NTR 2000 Token Ring	435

SMC (Western Digital)

8003 Plus Elite 8 bit coax	99
8013 Plus Elite 16 coax / 6 pk	125/625
8013 Plus Elite 16 TP / 6 pk	127/629
8013 Plus Elite 16 Combo / 6 pk	149/775
8013 Plus/A for MCA / TP	195/199
8033 Elite 32 coax / TP	595/599
8 Port Concentrator (8TP + 1AUI)	349
12 Port Concentrator (12TP+2AUI+1BNC)	595
Elite Ultra 16 coax / TP / Combo	110/112/129
Netware Boot ROM for Ethernet	34
Token Ring 16/4 ISA / MCA	279
Token Elite Passive MAU 8 / MAU 16	415/599

SYNOTICS

Network products	call

XIRCOM

PCMCIA CE-10B2 BNC / CE-10BT	275/279
PCMCAI CE-10BC Combo	315
PE3-10B2 Pocket Adapter coax	285
PE3-10BT Pocket Adapter TP	289
PE3-10BC Pocket Adapter Combo	325

OTHERS

Mailman 2.0 (10-user for Novell netware)	*(99)

CABLES & ACCESSORIES

10BaseT, Level 3 plenum 1000'	165
Belden 8259, RG58 1000'	165
RG58 500' / 1000'	65/109
Twisted Pair 4-pair, PVC, Level 3	
- 1000' / 500' / 200'	89/55/35

16. NOTEBOOK

MITAE

Mono 486SX-25, 4MB, 130MB HD	1295
Passive Color 486SX-33, 4MB, 130 HD	1795

17. POWER SUPPLIES

AMERICAN POWER CONVERISON

APC-400 Smart-UPS (286, 386 WS)	289
APC-600 Smart-UPS (386, 486 FS)	359
APC-900 Smart-UPS (386, 486, FS & WS)	569
APC-1250 Smart-UPS (multiple FS & WS)	699
APC-400 Back-UPS 286, PS/2, 386	179
APC-450 Back-UPS 286, PS/2, 386	215
APC-600 Back-UPS 286, 386 FS	285
APC-900 Back-UPS	395
APC PowerChute Plus :	
- for Novell	59
- for OS/2, Lan Server, 3 Com	75
- for UNIX / XENIX	99
Power Doctor (DOS) I/F Kit for Smart-UPS	79
Surge Arrest Unit	call

GENERAL

250W for Baby AT / Baby or Mid Tower	45/45
250W for AT / Full Tower	47/49
300W for Full Tower	69
550W for UPS	279
1200W for UPS	659

PC POWER COOLING

Standard 220 for Desktop / Full Tower	85/85
Silencer 270	
- for Slim (baby or mid tower)	149
- for AT Desktop / Full Tower	165/165
Turbo Cool 300	
- for Slim (baby or mid tower)	149
- for Desktop / Full Tower	175/175
Turbo Cool 450	
- for Desktop / Full Tower	325/325

TRIPP LITE

Isobar 4	49
Isobar 6	55
Isobar Console CC16 Plus w. RJ11	85
Isotel 4 w. RJ11	58
Isotel Ultra 6 w. RJ11	65
UPS Monitoring Board for Netware	59

18. PRINTER

BROTHER

HJ-400 Desktop Ink Jet for PC or Mac	285

CANON

BJ-200 Ink Jet	319
BJ-300 Desktop	349

CITIZEN

GSX 145 24 pin, 132 column	355
GSX 230 Fonts & Quiet (rebate $40)	229
GSX 240 Scalable Fonts & Quiet (rebate $40)	285
PN48 1ppm, 2lb, battery, case, for notebook	299
Accessories :	
- Color Option for GSX 130	45
- Color Option for GSX 145	65

HP (Hewlett Packard w. toner)

Desk Jet 500 / 500C / 550C	295/395/499
Desk Jet 1200C / Postcript	1375/1975
Jet Direct 10BT	429
Laser Jet 4 / 4M	1385/1895
Laser Jet 4LM	999
Laser Jet 4P / 4PM	975/1375
Laser Jet 4Si / 4SiMX	2995/4295
Paint Jet / Paint Jet XL300	695/2295
Accessories :	
- Envelope Power Feeder 75 Sheet (LJ4)	279
- Legal, Letter or A4 250 Sheet Tray (LJ4)	99
- Legal, Letter or A4 500 Sheet Tray (LJ4)	109
- Lower Cassette w. Letter Tray (IIP, IIIP)	149
- Optional 500 Sheet Legal Letter A4 (LJ4)	279
- Postcript (LJ4)	359
- Toner for LJ II, III	79
- Toner for LJ IIP, IIP+, IIIP	66
- Toner for LJ4 / LJ4L or 4P / LJ4Si	109/69/135

LASER MASTER

Win Printer 800 Postcript	1075
Win Printer XL600 11x17, 600x660ppi	2350
WinJet 1200 Postcript for LJ4	*(650)
Utility XL1200 / XLT / XLO	4795/6495/7995

MICROTEK

TrueLaser MTP-306 6ppm, 2MB, 35 fonts	995

OKIDATA

Printers and Accessories	call

PACIFIC DATA

ProTracer II Ink Jet (CAD Plotter) A4 to A2 size, 360dpi, I960RISC, 512k, 45dBA	1399
ProTracer II-GL2 w. HP-GL2 & 2MB	1759
Accessories :	
- HP-GL Emulation Card	375
- Ink Cartridges	19.50
- Postcript Emulation Card	375
- Sheet Feeder I / II	135/115

PANASONIC

1124i / 1624	259/379
- Auto Sheet Feeder for 1124 KX-P36	120
1150 9 pin, 55dBA	139
2023 24 pin, Quiet	199
2123 24 pin, 43.5dBA, Color capability	239
2124 24 pin, 43.5dBA, Color capability	319
2180 9 pin, 45dBA, Color capability	179
2624 24 pin, 46.5dBA, Quiet	399
4410 Laser, 512k, 5ppm	549
- Corona KX-PCR3	49
- Developer KX-PDP4 / KX-PDP5	110/125
- Drum KX-PDM4 / KX-PDM5	99/109
- Extra Cassette KX-PKC2	45
- Fonts Card KX-P47x	95
- Fuser Unit KX-PFS5	105
- Optional Second Cassette KX-P495	135
- Toner KX-P453	42
4420 Accessories	
- Developer KX-PDP2	95
- Drum KX-PDM2	99
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- Legal Tray KX-P425	45
- Ozone filter KX-PFT2	29
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- Envelope / Legal / Letter Tray	69/69/69
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25 in One! III for HP II, IID, IIP, IIP+, III, Microtek	245
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Font Bank for all HP Lasers (stores soft fonts) 0.75MB / 1.5MB	205/269
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HP

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LOGITECH (Hand Scanner)

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- w. Omni Page OCR	189
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DJ-20 250MB QIC-80 oem / reg.	145/159
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FastView P9000 VLB 2MB	395

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- Utilities 7.0	*(99)
On Target for Win	89
PC Anywhere 4.5 Remote & Host Dos	115
- for Win	119
PC Anywhere Lan Complete	385
Q & A 4.0 Dos	239
Q & A for Win	*(165)

WORDPERFECT

PlanPerfect	*(195)255
Wordperfect 5.2 for OS/2	279
- upgrade	105
Workperfect 6.0 Dos	269
- upgrade	99
- Educational Offer	*(99)
Workperfect 6.0 for Win	275
- upgrade	99.50
- competitive upgrade	125
- w. Quattro Pro	295
- Educational Offer + Quattro Pro	135
WP Office 4.0 for Win - server	175
- Client 5 pk	289

OTHERS

After Dark Screen Saver	29
- More After Dark	27
ALDUS	
- Freehand 3.1 for Win	379
- Pagemaker 5.0 for Win / w. Scanner	*(499)/529
- Persuasion 2.1 for Win	325
- Photostyler 2.0 for Win	*(295)355
AST (business or medical s/w)	call
Asymetrix Multimedia Make Your Point	45
Bitstream True Type Font Pack	*(9)
Body Works 3.0	39
Boot Con 2.0	49
By Design for Win	59
CAERE	
- Fax and Find for Win	155
- Omni Page Direct OCR	185
- Omni Page Professional 2.1 for Win	*(465)
- Omni Scan	299
Canvas for Win	265
- competitive trade up	99
Carbon Copy 6.1 Guest & Host Dos	112
Carbon Copy 2.0 for Win	115
Check-It Pro Analyst for Win	85
Check-It Pro vol.1	59
- vol. 1 & 2	85
Claris Works for Win	99
- w. Quicken	125
CommonWorks for Win	125
Corel Draw 3.0	*(129)
Corel Draw 2.5 for OS/2	135
Corel Draw 4.0	385
- upgrade	215
Corel Draw 4.0 - CD version	355
- upgrade	199
DacEasy Accounting 4.4	95
Dash Board for Win (by HP)	45
Design CAD 2D 7.0 for Win	179
Direct Access 5.1 Dos	65
Direct Access for Win	29
Disney Screen Saver	29
Drive Rocket	29
EasyDOS (menu for Win)	25
Eclipse Fax 1.1 for Win	69
- w. OCR	85
Energizer Bunny Screen Saver	15
Fastback Plus 6.0 Dos	89
- 3.1 for Win	99
Fax-It WINDOS	69
File Maker Pro 2.1 for Win	*(125)
Font Minder for Win	55
Fractal Design Painter 2.0 for Win	255
- X2 for Win	75
FrameMaker 4.0 for Win	549
- upgrade	189
FTP : PC/TCP Dos / for Win	345/345
GDI : Flash Form	55
GDI : Wind Form	65
Grammitik V Dos	57
- for Win	59
Harvard Graphics 2.0 for Win	*(265)
- upgrade	89
Harvard Graphics 3.06 Dos	375
Hijaak 2.1 Dos	89
- 2.0 for Win	85
Hollywood for Win	*(39)
Idealisher 4.0	99
IIT XtraDrive 3.0 (data compression)	65
Intermission Screen Saver	29
Johnny Castaway Screen Antics	19
Kodak PhotoEdge CD	89
Kodak Shoebox Image for Win	*(95)
LapLink V	105
- upgrade	55
LapLink V Netware	*(125)145
Mac-in-Dos for Win	99
Pacioli 2000	*(10)
Peach Tree Accounting 2.0 for Win	115
PFS : Publisher for Win	43
Power Basic	95
Power Japanese for Win	225
Power Search (file manager)	39
Printshop Deluxe 1.2 for Win	49
Printshop Business	27
Procomm Plus 2.1 Dos	69
- 1.02 for Win	95
QA Plus 4.7 Dos / for Win	85/89
Quark X Press 3.1 for Win	559
Qualitas 386 Max 7.0	63
Right Writer 5.0 Dos / 6.0 for Win	29/29
SpinRite 3.1	79
Stacker 3.1	95
- upgrade	55
- for OS/2	125
StageSoft Accounting	125
- w. Payroll / Lan version	159/285
Star Trek Screen Saver	29
Superstor 2X / Pro 2X	49/79
This is My Computer	8.50
Time Slip 5.0 Dos / for Win	169/189
Turbo CAD 3.0 w. free 500 drawing symbols	85
- Professional version for Win	219
Turbo Tax Headstart State Dos / for Win	23/23
- Headstart 1040 Dos / for Win	43/43
- w. Quicken for Win	59
T-Value 3.0 (interests, loan)	59
Uninstaller 2.0 (microhelp)	45
Unixware Personal Edition - CD version	175
Ventura Publisher 4.1 Education Offer	185
Vista Pro 3.6	69
VISIO 2.0 for Win	*(125)199
Wave for Win	75
Winfax Pro 3.0	79
WinSense (windows optimizer)	49
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Wordscan 2.0 / Plus (by CALERA)	179/425
XTree Gold 3.0	95
Xtree 1.5 for Win	65

USER GROUP NETWORK

BULLETIN BOARDS

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The Adventure Connection. (408)985-1529, 732-4908; (415)321-3661, 365-7002, 573-1063, 244-9218; (510)797-4101. 24 hrs., Multiuser, interactive D&D style fantasy adventure game (similar to MUDD), chat parlor. [Exp. #119.]

First Online. (408)257-5800; (415)334-2400, 598-0398; (510)426-6030, 797-8730. Over 30,000 files, 4.2GB, PC-SIG library, adult files. PC and compatibles. [Exp. #121.]

Interactions BBS. (408)258-8913, (415)469-5510, (510)832-0560 Twelve line chat (over 18 only). Two-week free trial. Sysop: C. Watson. [Exp. #120.]

Lambda. (415)572-2591, 755-9439; (510)268-9891. Adult, mostly gay/lesbian, all are welcome, email, chat, matching. Free trial. [Exp. #120.]

'Lectrick Blue. (510)376-3805, 525-5332, (415)255-6293. 300/1200/2400/9600/14,400. Internet, Usenet, WWIV-Net, WWIV-Link, VBBS-Net, Fido, Adult-Net, Icenet, 350-plus message bases, games, and more. [Exp. #119.]

Nasty Playmates. (408)374-7264, 374-8930; (415)969-1129; (510)713-0703, 276-5446. 32 lines of naughty fun. Adult chat, matchmaker, personal ads, X-forums and file areas. Over 18 only. [Exp. #120.]

Paul Revere Network. Multi-Zone. (209)472-0843; 438-7621; 795-1474, 998-8845; (408)947-7800; (510)791-8264; (707)427-1310; (916)361-2827. Nationwide 50+ node BBS network of grassroots firearms rights activists. PRNKIT.ZIP file for full nodelist. [Exp. #121.]

Pro-Line BBS. (408)226-3880, (415)390-2923, (510)888-1130. 24 hrs. Chat, matchmaking, database, lifestyles, email, and more. [Exp. #120.]

209

BerthaBoard. (209)823-0093. Up to 21,600. HST/V.32ter. Two lines, 6+GB, 65,000+ files, large message base. [Exp. #121.]

Exxxtacy BBS. (209)962-4045. Over 10,000 adult files. New member bonus. Free adult video with membership. [Exp. #120.]

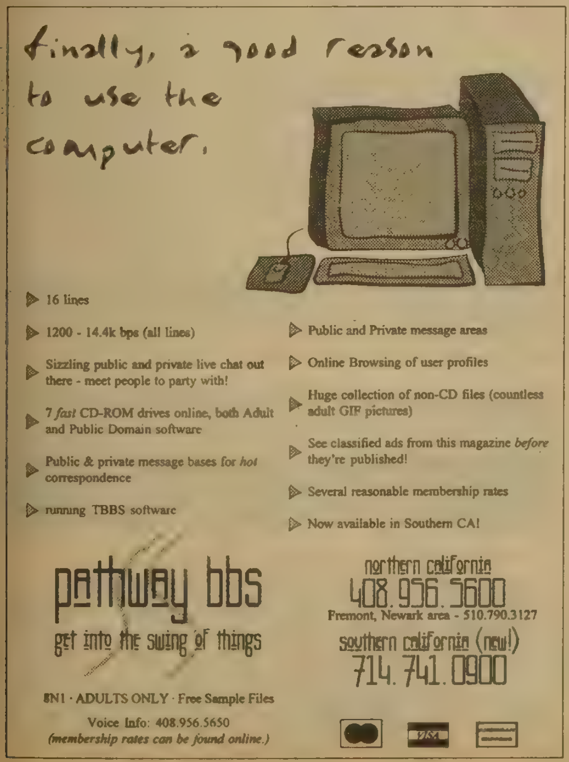
The Haunted Castle BBS. (209)826-1900. 2.3 Gig, 10,000+ files online, echo mail, multimedia, Gifs, games, and more. Since 1989. Sysop: Dave Clifford. [Exp. #121.]

408

#1 Fun Seekers. (408)379-0958. 8-N-1, 24 hrs., up to 38,400. IBM files for all ages. Adult too. [Exp. #121.]

A32 Macintosh Users Group BBS. (408)378-8252. 24 hrs., 9600. Mac, FirstClass. [Exp. #120.]

Amateur Action BBS. (408)263-3393. 8-N-1, 18,000. Adult amateur GIF files, 32 lines. [Exp. #120.]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Autos Online. (408)356-1306, 356-3866, 358-2010, 356-1125. 1200/2400. Shop Bay Area new car dealer inventories, private party for sale and wanted. Join vehicle-related forums. No fee. [Exp. #121.]

BayNar-Net. (408)926-8547. 24 hrs., 2400. Model rocketry, astronomy, IBM programs, family oriented, NAR affiliated. Sysop: Phil Hayton. [Exp. #121.]

Casa del Cyborg. (408)457-2654. 24 hrs., 14,400. First class GUI, Mac files, and active message base. OneNet member. Free. Sysop: Curt and Emil. [Exp. #121.]

The Checker Demon BBS. (408)264-9018. 8-N-1, 14,400. Comic and RPG BBS! Focus on Hero Games products. Sysop: John Taber. [Exp. #121.]

Cruzio. (408)423-9995 (2400 bps), 423-1987 (9600 bps). 8-N-1, 1200/2400/9600/19,200. 10 lines, UseNet news, email, ftp, gopher, IRC, MUD. Sysop: Chris Neklason & Peggy Dolgenos. [Exp. #120.]

Data Vortex Comm. BBS. (408)685-1502. 8-N-1, 1200/2400/9600/14,400. Host/gateway to 1200+ system. "Tech Net," files, forums, and global chat. Sysop: Michael Welch. [Exp. #121.]

Escape To Other Worlds BBS. (408)956-1750. 8-N-1, 1200/2400/9600/14,400. SF/fantasy, comics, games, msgs., four lines, D/L files. Mac and PC GIFs, 1.8GB. [Exp. #121.]

Grey Matter BBS. (408)749-0740. 8-N-1, 14,400. RIP graphics, online games, adult graphics, computer consulting. DOS, Windows, games, and more. Free. [Exp. #121.]

The LaserBoard. (408)268-4863, 268-6323. 24 hrs., 14,400 RIME, local TNET, and Wildnet conferences. Soon to carry USENET. Call for latest files. Free. Sysop: Shawn Higgin. [Exp. #120.]

Laser Light BBS. (408)365-7778. 8-N-1, 24 hrs., 1200/2400/9600/14,400. IBM, specializing in game-related files. Sight and sound demos. Sysop: Rob Mueller. [Exp. #119.]

LINCS-BBS. (408)294-6933. 8-N-1, 300/1200/2400/9600/14,400. Disability, chronic health and other conditions that affect children. Resource directory, internet mail, and more. [Exp. #120.]

Mariposa BBS. (408) 847-8508. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400/16,800/19,200. IBM files: educational, games, religion, business, and entertainment. Sysop: Alex L. Raposa. [Exp. #120.]

The Meating Place BBS. (408)926-6174. 24 hrs., 14,400. Gay/Bi, six lines, email, chat, matchmaker, GIFs, and more. System password: Micro. Sysop: John C. Lambert. [Exp. #120.]

Megamedia Multimedia BBS. (408)428-9901, 428-9926. 24 hrs., 2400 to 28,800. 3GB of files, multimedia, windows, NT, and more. Download files on first call. Sysop: Raaj Menon. [Exp. #120.]

Mongoose BBS. (408)733-3034. 24 hrs., 14,400 USR HST DUAL. SmartNet, adult files, latest sharewares on CD-ROM. Free. Sysop: Robert Yagmourian. [Exp. #121.]

Monterey Gaming Systems. (408)655-5555. 300/1200/2400/9600/14,400 on all 24 lines. Free Internet, email, live chat, contests, games. Free. [Exp. #121.]

Nitelog BBS. (408)655-1096. 24 hrs., 300–16,800. DOS/Windows/OS2 adult files, 24 lines, 6.3GB. Sysop: Karl Van Lear. [Exp. #120.]

Pacific Exchange BBS. (408)946-8561. 12 lines, 50,000 IBM/Windows files, adult files, online news, games, and more. [Exp. #120.]

Paradise City BBS. (408)280-6630. 1200–57,600. Over 35,000+ of the newest files including adult. Relaynet™ network email. Free first call. Sysop: Jim Reed. [Exp. #121.]

RC Labs BBS. (408)732-5353 14,400. AutoCAD and 3-D Studio files and topics. Sysop: Andy Joncich. [Exp. #120.]

The Screamin' Mac BBS. (408)257-2029. 8-N-1, 24 hrs. All fun. Mac-based with some IBM files. ANSI graphics supported. [Exp. #121.]

SJ Advisor. (408)274-6004. 10 am–10 pm. 300/1200/2400/9600. Politically oriented. San Jose, Santa Clara County, some CA and Federal. [Exp. #121.]

The Support Network BBS. (408)259-0297. 8-N-1, 2–8 pm. 1200/2400/9600. Community computing for Santa Clara County. Now with RIP

Continued

BAY AREA BBSes

By Kathleen Creighton

The Net, For Humans

Did you see the *NBC Nightly News* series the week after Christmas, "Almost 2000"? Part of it was an accurate, if superficial, look at online life today. The most interesting part of the story, though, was that NBC News set up an Internet email address (*nightly@nbc.com*) for viewer feedback and announced it every night after airing the evening's segment. In what has to be a television first, the power of the Internet met mainstream media.

You probably know how to reach Rush Limbaugh on CompuServe, but did you know that there are television stations and individual programs online? *Geraldo* and the *Rikki Lake* talk shows have a presence on America Online, as does C-SPAN. And if you've ever torn out your hair trying to catch something on C-SPAN, its broadcast schedule is there too. But if you watched those talk shows or C-SPAN, you wouldn't know you could reach them online (either directly on America Online or indirectly via Internet email) because, to my knowledge, none of them advertise their America Online presence.

Jokes about *Geraldo* viewers notwithstanding, how are Americans, most of whom are not only not online but avoid computers like the plague, ever going to be exposed to the power and the riches of the net? It can no longer be considered the exclusive club for the technician and academician, and every day a few more "civilians" join up to look around. The *NBC Nightly News* attempt was a good start at exposing Americans to the practical uses of the net, but when the series ended, it stopped promoting its Internet email address.

MAKE IT USEFUL AND THEY WILL COME...

I am often asked if "this Internet business" is real or hype, and I am often asked how people already online can interest others to sign up. These questions intersect into an answer.

When "the net" (here I'm loosely combining the Internet, commercial online services, and local BBSes) has enough interesting information and services, and has the good sense to educate and expose the American public to their existence, more "ordinary folks" will see the benefits of being online and will make the effort to be there (as long as the price is right).

That means that those of us with an interest in BBSes, online service forums, and specific Usenet newsgroups will have to change the way we look at them in order to promote them—the time for exclusive advertising on deathly dull financial programs and politically oriented talking head shows is over.

At the same time, the companies, associations, radio and television programs, and other entertainment media using the net have to get some common sense and start integrating their net presence with their offerings in much the same way the *San Jose Mercury News* has integrated its presence on America Online with a major daily newspaper. The *Geraldo* and *Rikki Lake* shows need to put the names of their America Online forums in the shows' credits.

To illustrate how indifferent these entities can be to the "power of the net," I recently received a huge packet of new member information from a national organization which I just happen to know has a presence as a great resource on America Online. I was surprised to see that the organization's online forum was not mentioned anywhere in the many pages of information I read through. When I spoke to a local representative of the organization, he didn't know it was on America Online either.

It's maddening to think about the huge number of members who could be actively helped by being online—not

Continued

BBSes continued...

graphics. Sysop: Frank Arnold. [Exp. #120.]

The Virtual Reality BBS. (408)246-5434. 8-N-1, 1200/2400. Games, files, and Net mail coming soon. Free. Sysop: Jim Busby. [Exp. #121.]

415

AHA Hydrogen BBS. (415)494-3316. 8-N-1, 1200/2400/9600/14,400. Alternative energy info—prosperity without pollution. [Exp. #121.]

Anatomically Correct BBS. (415) 856-8425. 24 hrs., 2400. Discussions of adult issues, more than 100 X-rated stories. No GIF files. Free. Sysop: Howeird. [Exp. #120.]

Bay Area Luv Connection. (415)822-7550. 24 hrs., adult board, 16 lines. Fee. Voice: (415)239-1028. Sysop: Ronnie Parker. [Exp. #120.]

California Online! (415)331-4081. 14,400. 20 Lines, wide local calling area. Internet email, Usenet Newsgroups, realtime Internet gateway. Sysop: Jim Thornson. [Exp. #120.]

ComPUCall. (415)703-1297. 7-E-1, 1200/2400. California's Public Utilities Commission's calendars, decisions, releases. [Exp. #120.]

Creekside BBS. (415)343-5692. 1200/2400/9600/14,400. Genealogy & history files and messaging. Intelec, Seeknet, Science Factor Net, GTpowerNet. [Exp. #120.]

The Elfspire Tome BBS. (415)595-2387. 1200/2400/9600. A fantasy roleplaying G.M. resource bulletin board featuring roleplaying, games, fantasy clipart, and more. [Exp. #120.]

5-Star BBS. (415)703-0150. Formerly Tangent. Gay/bi cruising, dating, and chatting. Oracomm software, eight lines. Adult only. [Exp. #120.]

Fog City. (415)863-9697. 8-N-1, gay & lesbian community/chat, matchmaking, CD-ROMs, games. Internet email. [Exp. #121.]

Fun University Network. (415)327-4591. 8 lines. Free graphical interface, hosted multi-player simulation games, current events focus. Sysops: Wendie, Mike, Lisa, and Scott. [Exp. #121.]

Graveyard Shift BBS. (415)397-2812. 1200/2400/9600/14,400. 100% adult files, Throbnet, Swingnet, Wildcat 3.9 RIP, eight lines. [Exp. #121.]

Hotline Computers BBS. (415)349-5136. 2400. Computer users' subjects, 1.2GB files, classifieds, shopping. Free. [Exp. #120.]

HTG/Outreach BBS. (415)572-9594. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. Gay/lesbian/bisexual/transgender, community system. Six lines. Chat, files, FidoNet, GayNet, PODnet. Free access on two lines. Sysop: Sagittarius. [Exp. #120.]

Incipits Remote BBS. (415)359-2067, 359-2068. 1200–38,400. Tons of DOS, OS/2, and UNIX shareware. Distribution point for 386BSD PD UNIX and X11. [Exp. #120.]

InfoDude Communications. (415)855-9500. 24 hrs., 2400/9600/14,400. Email, teleconferencing, forums, file areas. First thirty hours free; $3 a month after that. Sysop: Joseph A. Jenkins. [Exp. #120.]

The Informer BBS. (415)468-6713, 468-6714, 468-6715. 24 hrs., 2400–14,400. TCalNet, Intelec, FamNet, WindNet, Newlife, Operating Systems, Tech Specs, and more. Sysop: John Custer. [Exp. #120.]

In Sync. (415)507-9463. 14,400. Online door games, GIFs, CD-ROM, and more. $5 registration fee. Sysop: Tektronix. [Exp. #120.]

Intimate Images. (415)598-0898. 1200/2400/9600/14,400/16,800. Original adult images and video clips. The Bay Area's finest adult files. [Exp. #121.]

Key Software Products BBS: (415)364-9847. 5 pm–8 am, 24 hrs. wknds. 1200/2400/9600. Tech support for the Last Byte Memory Manager. Internet email, fax-mail, Simtel-20. Free. Sysop: Dan Lewis [Exp. #121.]

Recovery BBS. (415)255-2188. 8-N-1, 300/1200/2400. Dedicated to 12-step recovery programs. AA, NA, Al-Anon/ACA, SLAA. Recovery and 12-step Echos. Fido 125/9. Sysop: Rich Gorlin. [Exp. #120.]

R & L Investments. (415)878-9157. 24 hrs., 2400/9600/14,400/16,800/19,200. Large file base, email, online ordering. Business opportunities. RIP graphics. User-friendly. [Exp. #121.]

The Road Not Taken. (415)648-8462. General conversation, discussion of current issues, miscellaneous blather. Free. Sysop: Bryan Magers. [Exp. #120.]

Skeptic's Board. (415)572-0359. Science and fringe science. Internet/Usenet access. San Mateo. Sysop: Rick Moen. [Exp. #121.]

Tsoft BBS and Public Access Unix. (415)969-7958. 8-N-1, 10 lines. Unix accounts on the Internet. info@tsoft.net. Free. [Exp. #121.]

Uncle D's Directory. (415)364-3001. 8-N-1, 24 hrs., 1200/2400/9600. Hearing-impaired and educational purposes, game doorways, RimeNet, and more. No fees. [Exp. #121.]

/usr/school/BBS. (415)564-8896. 7-E-1, 24 hrs., 1200/2400. How to access the Internet, C & UNIX classes. If garbage, press space. Sysop: Dennis McMamara. [Exp. #120.]

VidGame BBS. (415)742-6457. 2400/9600/14,400/16,800. Games 7000+ steamy adult GIFs, online games, 3.5+ Gigs space, 1000's of utilities. Sysop: George Hassmer. [Exp. #121.]

Virtual Pleasures BBS. (415)802-0500. Intimate sexual experiences for literate adults. Straight to gay, vanilla to kinky. Women free. [Exp. #121.]

Wetware Diversions Public UNIX. (415)826-0397. 8-N-1, 24 hrs., 1200/2400. Eight lines, full UseNet news. Sysop: Eric Swason (editor@wet.UUCP). [Exp. #120.]

Window World BBS. (415)931-0649. 24 hrs. For people who use Windows-type software; info, shareware, chat. Sysop: Bob Cram. [Exp. #121.]

510

8-Bit Apple User Group. (510)294-8052. 24 hrs., 300/1200/2400. Apple II support, email, messages, games, files. Free. Sysop: Noel Anklam. [Exp. #121.]

Activist. (510)532-6248. Lots of conspiracy text files—CIA, KGB, FBI, JFK, RFK, MLK, NSA, ADL, CFR, etc. Sysop: Walter Alter. [Exp. #120.]

Amiga Addicts Anonymous BBS. (510)680-2850. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Amiga files. Free. Sysop: Stanley R. [Exp. #121.]

Bay Area Mega Board. (510)247-8300. 14,400. 16 lines, 26.7GB, chat, GIFs, nets, games, daily international news and magazines. [Exp. #121.]

BayB—The Bay Area Baby

BBS Column continued...

only on America Online, but in similar groups on other services and on Usenet—and who aren't there to participate simply because they don't know what's going on.

Similarly, in the not-too-distant future, putting local BBSes directly on the Internet (and therefore making them directly accessible to anyone with a full-featured Internet account) will be trivial in technology and cost. Suddenly, the sysop's world will expand from, say, Fremont, to worldwide.

There are some outstanding boards out there, providing unique resources anyone would be proud to offer, their numbers dwarfing the hypothetical "five hundred cable television stations" of the future. Hobbyist sysops will join others across the net competing for users' time and attention. How will you let everyone already online know that your BBS exists, and how will you otherwise promote the existence of your special-interest board? The new technical capabilities and the vastness of the system they inhabit will require a new perspective.

In fairness, the mainstream media themselves have not cooperated with those who would like to get the information out. Every telecomm writer, for example, knows that mainstream magazines historically have not been interested in articles about being online. Now there's mild interest, but only if those articles have something to do with sex. The *NBC Nightly News* series was ground-breaking in discussing something other than sex and pornography online, but other entities can also help by incorporating information about their online presence in any standard media. Such an announcement might be an Internet email address on a business card or letterhead, all the way up to routine national advertising.

So, no, "this Internet business" isn't hype. Admittedly, it might be hard for "just folks" Americans to see the point of the net. In their defense, while there's quite a lot of interesting material across all services, there's certainly room for material and services more relevant to the day-to-day lives and concerns of "ordinary folks." MUDs and games and downloadable software aren't going to do it. Integrating the net with television—maybe the Internet addresses of individual programs listed in *TV Guide*—would be a painless, if perhaps somewhat frivolous, start. More relevant services for education, jobs, and housing can come later, and they must come in order for mainstream America to be interested enough to join in. ■

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The Association For Customer Support Professionals (ACSP). Meetings: Quarterly. Dedicated to the deveopment and furtherance of customer support as a distinct profession, to the growth of the support community, and to the improvement of support service. Call: (510)865-4515. Email: tao@well.sf.ca.us or 71333,2116@Compuserve.com. [Exp. #123.]

Association For Women In Computing. Meetings: 1st Wed., 6:30 pm, Sinbad's Restaurant, Pier 2, San Francisco Embarcadero. $15 members, $20 guests. Call: (415)979-8450. [Exp. #123.]

Association Of Information Systems Professionals (AISP). Write: 922 Weddell Ct., Sunnyvale, CA 94090. Forums, support, network for IS Professionals. Many SIGs. Call: Al Normantas, (408)745-7600. Fax: (408)745-0740. [Exp. #119.]

Black Data Processing Association, Silicon Valley Chapter. Meetings: 4th Thursday, 6:30 pm, Amdahl Corp., Bldg. H, 1240 E. Arques Ave., Sunnyvale. National network of DP professionals, educators, students, and vendor reps. Call: Willie Mackey, (408)280-7624. [Exp. #122.]

Computer Professionals For Social Responsibility. Meetings: Last Sun., 2:00 pm, BMUG Offices, 2066 Center St., Berkeley. Call: (510)987-0567. Email: kec@stubbs.ucop.edu. [Exp. #123.]

Computer Software Industry Association. CSIA monitors all state legislation which affects the computer software industry and some federal issues. Call: (415)948-9192. [Exp. #119.]

IEEE Computer Society, San Francisco Chapter. Meetings: alternating Weds., 7:30 pm, SF State. Call: (415)905-4400. [Exp. #119.]

Independent Computer Consultants Association, Northern California Chapter. Meetings: 2nd Wed., 6:00 pm, Gallaria Parc Hotel, 185 Sutter St., San Francisco. Open discussion, questions and answers. Call: (415)978-9416. [Exp. #123.]

Independent Computer Consultants Association, Silicon Valley Chapter. Meetings: 4th Thrus., 6:00 pm. Hobee's Resturant, 920 Town & Country Village, San Jose. Provides a network for independent computer professionals in South San Francisco Bay and Monterey Bay areas.. Call: Chapter Hotline, (408)492-8888. [Exp. #119.]

National Association Of Professional Organizers (NAPO). Meetings: 2nd Wed., 6:30 pm, Westin San Francisco Airport Hotel in Milbrae. The cost for guests who pre-register is $12; at the door, $15. Call: (415)461-3537. [Exp. #119.]

North Bay Systems Professionals. Meetings: 3rd Wed., 6:00 pm networking, 7:00 pm dinner, 8:00 pm speaker. Embassy Suites Hotel and Conference Center, 101 McInnis Parkway. NBSP provides a forum for systems professionals to grow and to benefit from a network of other like professionals. Call: (415)721-4409. [Exp. #123.]

San Francisco Computer Society. Meetings: 4th Mon., 7:00 pm, Presbyterian Church, 1329 7th Ave., San Francisco. Call: Bob Forsberg, (415)885-6206. [Exp. #120.]

San Francisco Robotics Society Of America. Meetings: 1st Wed., 8:00 pm, Exploratorium, San Francisco. Free. Call: Brad Smallridge, (415)550-0588. [Exp. #120.]

Society For Technical Communication, Berkeley Chapter. Meetings: 2nd Wed., 6:30 pm dinner, 7:45 pm program, Upstairs at Yenching Restaurant, 2017 Shattuck Ave., Berkeley. Different speaker every month. Call: (510)466-5464. [Exp# 119.]

Society For Technical Communication, East Bay Chapter. Meetings: 1st Thursday. Red Lobster in Dublin. A nonprofit organization for writers, editors, managers, educators, students, and graphic artists. Call: (510)831-1098. [Exp. #122.]

Society For Technical Communication, San Francisco Chapter. Meetings: 3rd Wed., 6:00, program at 7:00 pm. Stagecoach Resturant, 44 Montgomery St., San Francisco. For technical writers, editors, and other technical communicators. Some meetings are dinner meetings, for which reservatins are necessary. Call: (415)985-7121. [Exp. #120.]

Society For Technical Communication, Silicon Valley Chapter. Meetings: 4th Thurs. 5:30 pm cocktails, 6:30 pm dinner, 7:15 dessert. Sunnyvale Hilton, 1250 Lakeside Drive (off Lawrence Expressway at 101). Guest speakers, special interest groups, networking, job listings, newsletter. Call: (408)578-0796. [Exp. #120.]

Software Entrepreneurs' Forum. 3rd Wed., 6:30 pm, Elk's Lodge, 4249 El Camono, Palo Alto. Industry association dedicated to software developers and entrepreneurs, offering information and education on all facets of the software industry. Call: Information, (415)854-7219; reservations, (415)965-9003. [Exp. #123.]

Software Process Improvement Network. Meetings: 3rd Wed., San Ramon. For people interested in software process improvement, including theory and practical experience. Free. Call: Janet Deeney, (510)823-2348. Email: jmdeene@pbl.pacbell.com. [Exp. #123.]

United Sysops Association (U.S.A.). Meetings: 2nd Wed, 7:30 pm, call for location. Call: Beth Hall, (408)522-8690. [Exp. #123].

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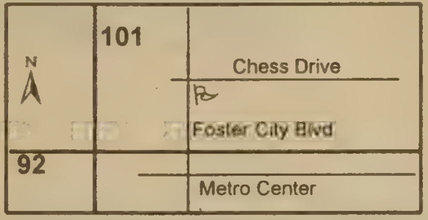

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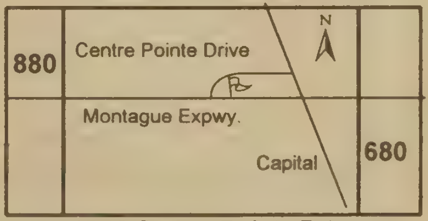

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Gabriel has a strong belief that technology should humanize and foster creativity and communication rather than lead to alienation.

CD-ROMs — New Catnip For Rock Stars

Peter Gabriel And Others Explore A New Medium

BY JONATHAN E.

In the '60s and '70s, making a movie was catnip for many rock stars; in the '90s, interactive digital multimedia products hold a similar allure for expansive musicians.

This is significant because of the major cultural influence rock music, along with TV and Hollywood movies, has exerted over the past forty years. While most rock-star movies demonstrated that the skill sets required for music making and acting were distinctly different, it is likely that at least the marketing cachet of familiar musical names will assist in the often-projected entry of multimedia into the mass market and the birth of its cultural clout. In addition to name-artist titles, CD-ROM-based magazines with substantial music and music-video elements, such as *substance.digizine* and *Zone*, seem attractive to consumers.

So far there has been very little actually available to the home consumer. Discounting various classical, karaoke, reference, and educational titles that have not relied on the musicians' personal involvement in any significant way, Todd Rundgren's CD-I title, No World Order, has been the sole marketplace contender. Rumored CD-ROM releases over the past six months have been far more numerous, with a panoply of familiar names from David Bowie to U2 to Motley Crue.

Peter Gabriel's CD-ROM, Xplora 1 Peter Gabriel's Secret World, has been perhaps the most eagerly anticipated and oft-delayed title, while The Residents' Freak Show has also been much discussed. The time of rumors and delays is now finally over. Macintosh versions of both Gabriel's XplorA 1 and The Residents' CD-ROMs are now out, and Bowie's CD-ROM is promised for March release.

It is worth noting that, while these titles come to the consumer on the same CD-ROM medium, they otherwise share very

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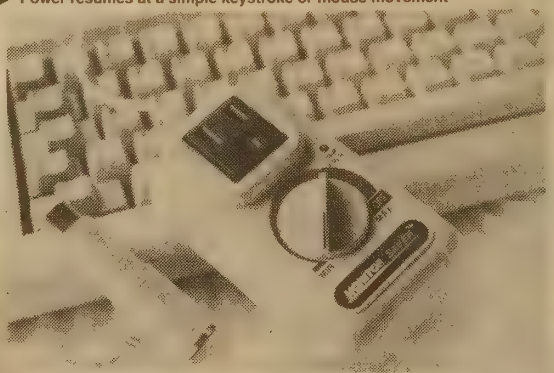

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little in common. Judging from brief glimpses of the Bowie and Residents' titles, the first primarily allows the consumer to re-edit one of Bowie's videos, and the Residents' title is an imaginary journey through an artist's interpretation of their music.

A future column will look at these two titles in more detail. Meanwhile, the Gabriel CD-ROM offers views of his background, previously released work that has not been collected together before, and his various other activities and interests.

XPLORA 1 PETER GABRIEL'S SECRET WORLD

Peter Gabriel has been a major musical figure for over twenty years, first with the progressive rock group, Genesis, and then for an even longer period as a solo name. He is acknowledged as a pioneer in the field of music videos, an early form of musical multimedia, and is also known for his spectacular and technologically advanced stage presentations.

His work in establishing the WOMAD (World Of Music, Arts, and Dance) organization led the way in making contemporary music from around the world available to the west. Its subsequent record-label offshoot, Real World Records, is perhaps the most important world music outlet in existence. His personal commitment to these cross-cultural ventures is legendary—the early days of WOMAD almost caused him to become bankrupt.

Gabriel has a strong belief that technology should humanize and foster creativity and communication rather than lead to alienation. His activism on behalf of human rights is admirable and exemplified by his work with Amnesty International and his founding of the Witness Project, which arms human rights activists with video cameras and other communications devices to document abuses.

The Xplora 1 CD-ROM is crammed with more than 600MB of video, sound, art, and text, effectively demonstrating this wide range of Gabriel's interests, commitments, and accomplishments. It includes over one hundred minutes of video, forty minutes of audio, and over a hundred full-color photographic images. The package comes with a handsome full-color 60-page book, which contains mostly material not found on the disc. The question of why one would produce a book to go with a CD-ROM is addressed in the book; in fact, the two media complement each other quite effectively.

Although Gabriel has a longstanding interest in new technologies and the artistic acumen to create with them, this project came about because Steve Nelson, founder of San Francisco-based Brilliant Media, approached Gabriel with a completely speculative demo version based on his 1986 album, *So*. In October 1992, Gabriel gave Nelson the go-ahead to begin work on the final version, based on his new album, *US*. Since then, a transatlantic team of over forty artists, technicians, and programmers has worked through several iterations and $250,000 to create the release version of the CD-ROM.

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ORGANIZATION, NAVIGATION & INTERFACE

When you first open the CD-ROM, you hear music and the screen comes up a nice sky blue. An image of Gabriel appears in the top left corner above a horizontal bar and points down toward the lower left side of the screen, where there is a series of nine vertically arranged short color bars. He suggests you try clicking on them. If you pause too long, about a minute, Gabriel will gently remind you that "We need you to do something."

Clicking the top unlabeled green bar opens a suitcase, empty at first, which will fill with various items, principally backstage passes, as you click on them in the course of your explorations. The next four are inactive at this stage.

The bottom four bars are labeled "Explore," "Watch," "Resume," and "Quit." If you click on "Explore," an animation of Gabriel with another suitcase walks across the bottom of the screen, the suitcase pops open and you're presented with a puzzle that requires choosing the right facial features to reassemble Gabriel's face. If you take too long, the puzzle will be completed for you. If you get it right, Gabriel thanks you "for putting me back together." Once his face is assembled, the main screen comes up with a brief verbal explanation of the structure of the disc.

"Watch" will take you at random to somewhere on the disc. "Resume," according to the booklet/manual (distinct from the 60-page book), is supposed to allow you to "pick up where you left off if you've visited before." However, I could not discern what function it performed other than to take you to the main screen, bypassing the facial puzzle.

Xplora 1 is structured as a four-part world, meaning that you can explore four distinct sections, one at a time. These are represented on the main screen by Gabriel's sectioned face. Clicking on his mouth takes you to the US section, clicking on his ear lets you hear the World Music section, clicking on his eyes lets you see his Personal Files, and clicking on his nose lets you nose around Backstage behind the scenes.

Each section contains a variable number of items represented on the screen by clickable photographic images or illustrations. Each item also has its deeper layers of information, usually one or two. If you're at the top layer of a section, you can immediately move to another section by clicking on its icon on the top right of the screen. If you're at the top item level within a section, you can immediately navigate to other items in the same section by a similiar method.

The color bars and the strip at the top of the screen allow you to travel back up through the layers. The top green bar is constant throughout the disc for opening your backstage-pass suitcase. The next three bars, blue, purple, and a brownish ochre, take you back up to the main screen, to the item map for that section, or

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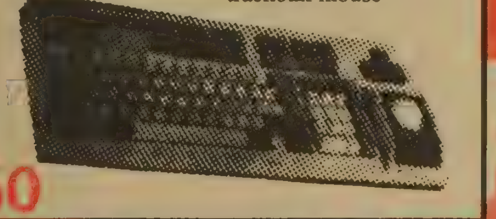

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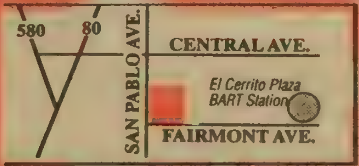

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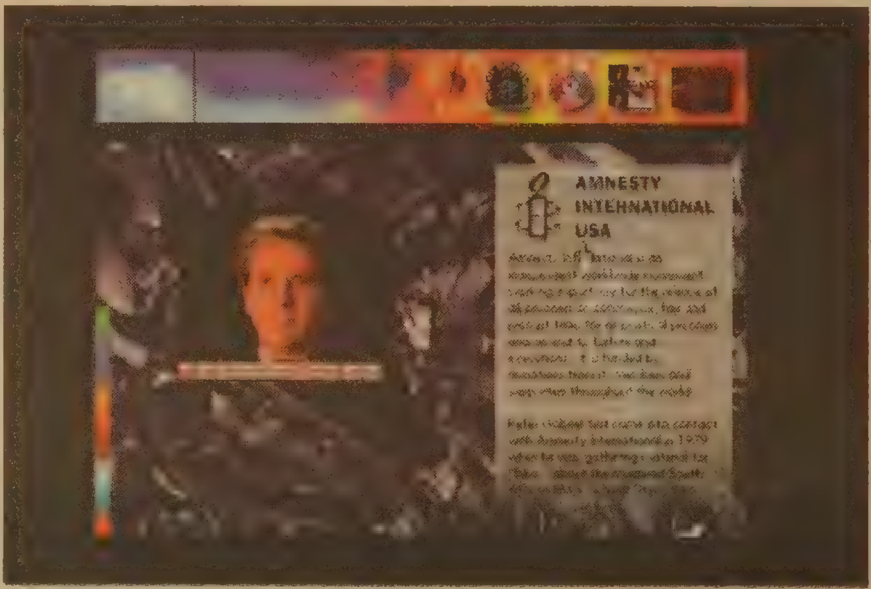
to the top layer of that item if it has multiple layers. Those same choices are available from left to right through the strip at the top of the screen. The cursor changes to a pyramid with one, two, or three horizontal lines above it, depending on how many layers back up you will travel.

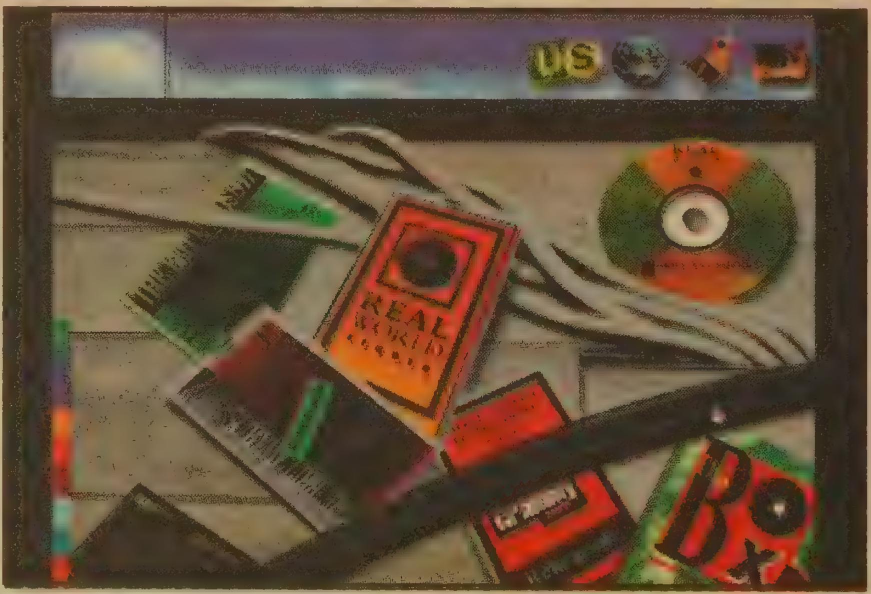
In the US section, the five lower color bars function as controls that allow you to see either 1) the video for the song if it's one of the four that has a video; 2) a QuickTime movie about the making of that video; 3) an art piece commissioned to go with the song (all songs have one); 4) text about the art piece, and 5) a QuickTime movie of Gabriel talking about the meaning of the song.

I was initially confused by some aspects of this design, particularly by some of the middle color bars being inoperative at higher levels and all of the bottom five color bars being nonfunctional everywhere on the disc except in the US section.

Many designers believe that if something looks functional—or is sometimes functional—and appears on screen, it should be functional. In this case, the decision was made to sacrifice that principle in order to maintain the graphic unity of the various screens. Those color bars are also an important element of the Real World label's graphic identity. I also suffered confusion from the same lateral position on the top strip taking me up a variable number of layers, depending on how deep I was. There's enough really attractive other stuff on the screen that the changed cursor just didn't register at first. Eventually, however, it all became reasonably simple and elegant.

I found two bugs associated with this navigational scheme. In the Backstage section, the ochre color bar would always take me into the Real World studio tour item rather than back up a layer. In the US section, if I looked at the art associated with "Steam," and then clicked on the ochre bar I received an error message. Pretty minor stuff, but the first was confusing when trying to figure out all the navigational details. I have been assured that these problems will be fixed on the second pressing of the disc.





INTERACTIVITY & FUNCTIONALITY

At the basic level of the computer responding to mouse clicks, the Xplora 1 CD-ROM functions superbly with the exception of the above noted bugs. Its response speed is more than adequate. In fact, for a product of this nature, the general complaints about the speed of CD-ROMs seem to have been vastly overstated.

The only problem I encountered was Gabriel's voice intermittently breaking up when he acted as tour guide. This is probably due to buffering difficulties on a particular machine rather than an actual CD-ROM problem. Otherwise, the sound and video were of extremely high quality. A particularly impressive feature is in the US section, where you can instantly access any part of the video by clicking on the relevant line of the lyrics.

On a more conceptual level of interactivity, the four most highly touted features of the CD-ROM are its Real World studio tour, the ability to remix "Digging In The Dirt," the jam session between various combinations of musicians, and the ability to "play" any of eight exotic instruments.

In the columns on MYST and Exploring Ancient Architecture, I addressed the reservations I have about the differences between getting around in the physical world and in the computer world. The same problems of loss of sense of direction and general lack of kinesthesia occur once again. In this case, I am not sure if the hand-held, point-of-view camera work and realistic sounds of footsteps and water running over the weir help or hinder. A more specific problem with this title is that, while you're touring some of the studio rooms, you're really nothing more than a fly on the wall—or, in the case of the control room, a dog running around.

Looking at a lot of electronic boxes with no explanation of what they do or simply peering over the shoulder of Gabriel as he works on a song transcription with Roger Bolton is basically pretty meaningless.

The ability to remix "Digging In The Dirt" is fun but the two principal lessons I came away from it with are that mixing is a highly skilled art and that the four supplied tracks of bass, drums, guitar, and vocals are not really sufficent to practice this art. Gabriel has indicated that he feels the same way and that future projects will include a more realistic simulation of the modern recording studio.

Brian Eno makes a guest appearance as the producer of the jam session. He defines that role as helping you get what you want, which he does by suggesting such things as finding a percussionist or using a vocalist.

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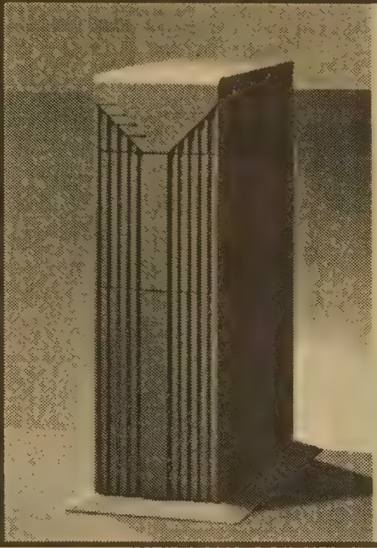

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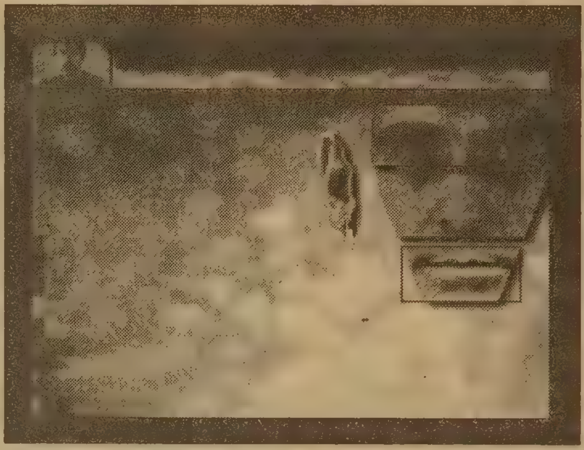

You do this by clicking on images of musicians and combining them in various ways. There are forty-nine possible combinations, each appearing as a QuickTime movie. I was confused by the ways in which you could and could not combine musicians—adding a musician to the jam sometimes caused even more musicians to become available and sometimes caused others to drop out. More time with Xplora 1 would probably make the reasons for this apparent, but I am not convinced that all is as it should be here. The real underlying issue is that your interactivity is limited to the combinations that have a movie available.

The exotic instruments are wonderful, beautifully illustrated with an expert player talking about where they're from and the traditions associated with them. The most impressive feature is their playability. Of course, clicking with a mouse is not the same as handling the actual instrument, but clicking different parts of the instrument plays distinctly different sounds, and it's possible to gain some real understanding of what's involved in making music.

SUMMATION

This column only skims the surface of Xplora 1, which contains a lot of information and other features. I can quibble about a few more minor details: the way text is handled with jumping rather than scrolling leads to some less than optimal situations; some of the color coding schemes are not clear enough; I'd be inclined to raise a few differences of opinion regarding content. However, it is important to remember that this is a new medium and that everybody is still learning how to handle it.

Overall, Xplora 1 is an excellent CD-ROM. If you have any interest at all in Peter Gabriel, a desire to obtain an overview of world music, or to merely see one approach to what's possible at this time in this medium, I recommend it highly. It's a product that makes the hardware worthwhile.

Xplora 1 Peter Gabriel's Secret World will play on any color-capable Macintosh (including greyscale Macs, such as PowerBooks) and on any speed CD-ROM drive. System 7 and a minimum of 4MB of RAM are recommended, as is at least 2MB of free hard drive space. A Windows version is scheduled for release late in 1994. It is distributed for a suggested retail of $59.95 by MacPlay, a division of Interplay Productions, Inc., 17922 Fitch Avenue, Irvine, CA 92714; 1-800-736-5738. ■

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Gossip From The Gulch

And Other Points Of Interest

by Jonathan E.

John Perry Barlow said it best at the Digital Be-In, January 7, when he proclaimed, "Let's think about the technology a little—and think about the people a lot." Interactive, digital, and multimedia are the buzzwords *du jour*, either alone or in combination. There's a great deal of debate about exactly what they mean, where the technologies are going, and what the results will be for our society. The terminology certainly refers to computer technologies, but the exciting aspect is that these are technologies that people can use to communicate ideas, facts, and artistic dreams and visions.

The South of Market area in San Francisco is a hotbed of activity, so much so that it's gained the *sobriquet* of Multimedia Gulch. However, in this modern, decentralized world of email, networking, telecommuting, and virtual corporations, there is action in many places and that action is interlinked through both people and megabytes. The rest of the City, the East Bay, the Peninsula, and Marin all have significant players, while Hollywood and the Seattle area also contribute considerable ferment to the brew. This "gossip" column will scout the terrain and bring back word of who's doing what and who's done what.

A quick way to taste the flavor of the local scene was to attend the Christmas member showcase and party of the **International Interactive Communications Society (IICS)**, held on December 14 at the McLaren Center of the University of San Francisco. Described with a touch of self-deprecation as "the Farmers Market of the Bay Area's cottage industry," this event had about forty developers and several hundred members in a festive mood—quite a different atmosphere from a trade show. Proving that there's a great deal of variety in the field, the goods displayed included authoring programs and tools, conferencing systems, training programs, games, and screensavers, as well as titles both original and book-based.

Two exhibits in particular caught my eye and, by coincidence, they're both in need of further funding. *Brothers* is currently a kiosk installation using videodisc along with a computer to teach gay African-American men about safe sex. It recently placed first in the Best Interactive Health Care category of the International Health & Medical Film Festival, with the awards ceremony to be held on February 12. *Brothers* may currently be seen at the Brothers Network, 631 O'Farrell, SF, from 10 am to 5 pm. Funding is needed for updating information and conversion to CD-ROM format. Call **Beckie Price** at (510)233-2984 for further information.

Paul Shain, who shot the video for *Brothers*, is also seeking funding for a spin-off version for heterosexual high-school and college students. Contact him at (510)526-6781. Paul also worked on the second exhibit, the Interactive Lighting Lab, one module of an eventual thirty to make up *Digital Video Magic*, based on the book *QuickTime: Making Movies on Your Macintosh* by **Robert Hone**. This is a subject ideally suited to interactive technology—there is no other medium that comes even close to imparting as much information in so short a time. Contact Robert at (415)456-8055. Robert is also willing to look at resumes.

Of course, there were some good parties around Macworld. *WIRED*, that multimedia event on paper, celebrated its first anniversary with a rowdy and fun party in what may become its new digs at Third and Bryant. As **Herb Caen** might say, the sight'em was the multimedia godheads of **Marc Canter**, **Joe Sparks**, **Ty Roberts**, and **Tim Oren** deep in conversation. ... Invitations for the HSC party at the Exploratorium, crammed with multimedia on a regular basis, were hard to come by—but not impossible. **Todd Rundgren**'s "uninterruptible" power supply went out, and the audience had fun interacting with his inflatable creatures, but—to my mind—the **Raster Masters** were the multimedia attraction with their high-powered, computer-generated video graphics. **Kai Krause**'s jaw dropped when he saw their visual effects. Kai is known for his own visually impressive Kai's Power Tools plug-in filters for Photoshop.

Brilliant Media, fresh from the **Peter Gabriel** *XPLORA 1* CD-ROM production, is working on an interactive TV project for **US West**. The prime focus is to see what happens with TV, as opposed to a CD-ROM title. Brilliant continues other projects for **Warner Communications** and **Disney**. ... **MNI Interactive** of San Francisco is moving ahead with its flagship product, **MusicNet**, an interactive, music previewing, currently telephone-based service. **Mike Mills**, of the Apple QuickTime and HyperMovie teams, has begun work on interface design and development of its CD-ROM and interactive television prototypes, bringing other team members **David Vronay** and **Leo Degen** with him. **Richie Unterberger**, once of *Option* magazine,

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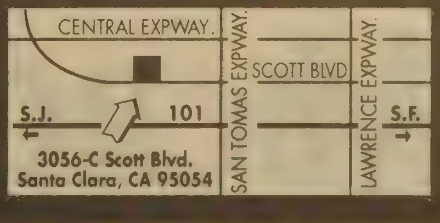

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is acting as managing editor for MusicNet's text content. MNI continues its telephone testing of MusicNet in the Sacramento area with focus groups. Other MNI Interactive news includes the completion of a $3 million venture capital joint deal with **Kleiner Perkins Caufield & Byers** and **The Mayfield Fund**, **Tim Mott** moving up to chairman, and **L. John Doerr**, of KPC&B, and **David Horowitz**, former CEO of MTV, joining the board.

Burt Arnowitz, of Arnowitz Studios in Mill Valley, reports a distribution deal with **Maxis**, with two soon-to-be released titles, *Daring to Fly—From Icarus to the Red Baron* and *Coral Reef—The Vanishing Undersea World*, both using an evolution of the software tools developed for an earlier title, *San Diego Zoo Presents the Animals*, a best seller with over 400,000 copies sold. Arnowitz recently raised $1 million in limited partnership funding and is currently negotiating for a further $9 million. A move to either Sausalito or Levi Plaza in the City is also in the works. ... I heard a rumor that *Substance.digizine* received seven venture capital offers and a deal of $4 million after recent publicity. When I attempted to confirm that, I was greeted with a belly laugh and a request to squash that rumor.

Cathy McDermott, of **Ebook, Inc.** reports that **Norman Whitfield** of Motown fame, has signed a multimedia deal with Ebook. There's also a deal in the works with a major film studio. She would not confirm or deny rumors of collaboration with **Mick Jagger**. **Jessee Allread** has become Ebook's new CEO as **Fred Jones** has stepped down to concentrate on his first love, content.

To try your own hands at the people end of digital art-making, look into the Home Movies series of weekend workshops at Joe's Digital Diner. Hosted by **Dana Atchley** and **Joe Lambert**, these workshops are designed for students to produce their own "Electronic Family Album," based on their autobiographical material and family archives. Each weekend has its own guest artist, such as **Abbe Don** or **Mark Petrakis**, leading the class. In addition, Dana will present his "Next Exit" interactive multimedia show on Thursdays from March 3 through April 14, and each weekend's artist will curate a show on Friday evenings after happy hour and dinner (cooked by Joe himself). The shows and dinners are open to the public and included in the cost for workshop participants. Call (415)824-9394 or email *jello@well.sf.ca.us* for full details. ... Finally, **Linda Jacobson** has reemerged from the further reaches of the future digital art world with a new tome, *Garage Virtual Reality: The Affordable Way to Explore Virtual Worlds*, published by Sams/Prentice Hall and available now for a mere $29.95. ■

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Multi & Media beyond

Information The Multimedia Way

Reference "Books" On CD-ROM

BY TONY REVEAUX

"We want information! Information!! Information!!!"

These incessant demands that The Prisoner endures in the opening of every episode are what the multimedia publishing industry is hearing from you—and it is responding in a flood of CD-ROM titles. Not only do encyclopedias, guides, directories, and dictionaries benefit from sound, animation, and video, but search/retrieval and nonlinear linking capabilities make the information more accessible and closer to the patterns of human thought.

Also, you can cut and paste into your own work.

ENCYCLOPEDIAS

"Encyclopedia: derived from ancient Greek word meaning whole circle of knowledge."

This is the definition given in Compton's Interactive Encyclopedia on CD-ROM, available in Mac and Windows versions ($345), the latest of several multimedia-rich encyclopedias now on the shelves. Considered the "ark of knowledge," this kind of reference is expected to be a cornucopia of data. Every encyclopedia tries to be a portable and utilitarian model of the known universe.

For starters, this silvery disc carries nine million words in thirty-two thousand articles; seven thousand images, maps, and graphs; fifty minutes of sound, music, and speech; five thousand charts and diagrams; and more than ninety multimedia sequences. Compton's product does its best to be a Swiss Army knife of info, and it succeeds fairly well. Different forms of information are accessible through Paths, whose icons on the path bar match those that appear within other windows for linking. The Idea Search is a good relational retrieval entry for following and developing lines of inquiry. The Articles, Pictures,

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Tony Reveaux, a San Francisco-based consultant, writes the "MediaScan" column in Film/TapeWorld. He can be reached via Usenet (luna@well.sf.ca.us) or MCIMail 290-3008.

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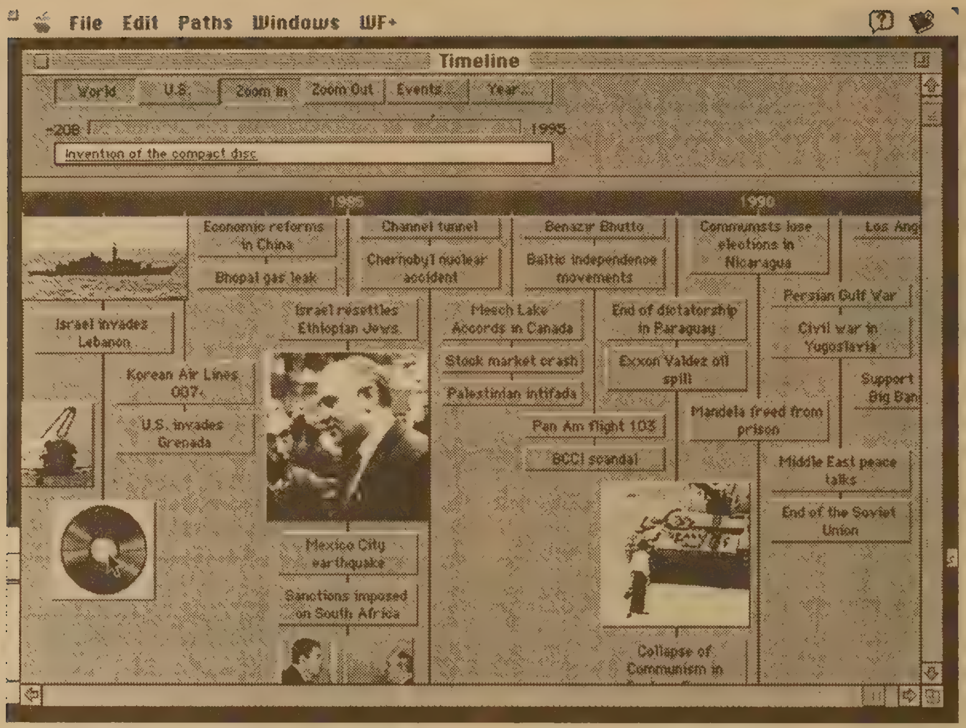

"The Timeline of the Compton's Interactive Encyclopedia can focus on either World or US events in the context of their developments and relationships."

Sounds, Movies, Atlas, Timeline, and Dictionary entry paths give you access, listings, and contents.

In the Topic Tree, the vast depth and breadth of the encyclopedia are readily apparent. Topics and subtopics are organized much like the Mac's Hierarchical File System in System 7. It makes for a very structured yet intuitive navigation method, with hyperlinking buttons for connections, plus clickable text elements that will bring up the relevant definition. Each picture, sound, movie, or article has linking buttons that let you jump directly to the next alternative related thing. You may find yourself spending hours absorbed in navigating across the webs of knowledge through these open connections. It's like enjoying a liberal arts education on a disc.

What to do with the many items you find that you want to work with is partially answered by Compton's Virtual Workspace. Like the virtual spaces in some CAD and graphics programs, it can be extremely effective in keeping the windows you have chosen open without having to tile them on top of each other. You can expand the Virtual Workspace to up to nine times the area of your monitor. In the little VW window, you can grab different window icons and rearrange them, or move the window aperture itself around the virtual area to instantly reorient what you see in the monitor. Running on a Mac Centris 650, I found it to be instantly responsive, no matter how many big full-color photo windows I had open. There were times when navigating the Timeline would cause even this powerful computer to crash. Ahh, the weighty burden of the millennia.

REFERENCE LIBRARY

This CD-ROM version of Compton's contains just about everything that is in the original print version. What you can't do with print is cut and paste, something you can easily do with a CD-ROM. For example:

CYBERNETICS. The interdisciplinary science that studies communication and control systems involving living organisms, machines, and even social organizations is called cybernetics. The term was introduced by American mathematician Norbert Wiener in his 1948 book entitled Cybernetics: or Control and Communication in the Animal and the Machine.

Want to learn more about the author? Just click "Wiener," and you get the dictionary's definition of

Wiener: FRANKFURTER [from German wienerwurst "Vienna sausage," from Vienna, capital of Austria]

Oops—sorry, Norb.

Clicking on a word will bring up its definition in the Dictionary—or as close as it can come. But when you are working from the Idea Search, it highlights the inquiry search in a contextual method. If you choose a subject such as furniture design, it will open a list of hundreds of relevant article titles. When you choose one, such as the architect Alvar Aalto, the article on him will open up, and every instance of the words "furniture" and "design" will be picked out in blue. You can work your way through threads of inquiry very swiftly and often find much more than you bargained for.

DICTIONARY OF THE LIVING WORLD

As extensive as the Compton's is, you can't expect it to provide all of the details of every category of information. Other CD-ROMs are arriving that use multimedia to make these other branches and niches of knowledge

High school or college students would be lucky to have The Dictionary of the Living World as part of their study materials, but it is clear and accessible enough to act as an authoritative reference for the generalist and the browser.

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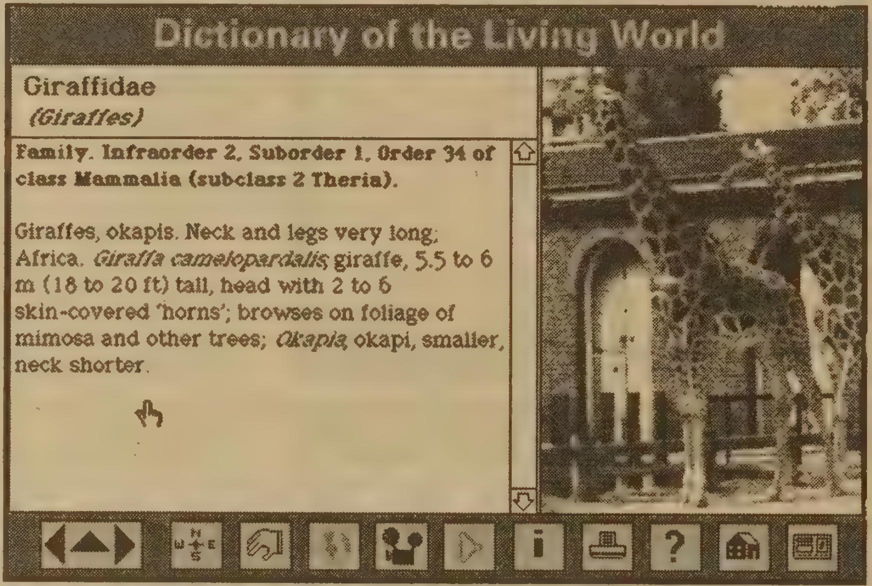
accessible and available. Dictionary of the Living World, available in Mac and Windows formats ($112.95), also from Compton's NewMedia, fulfills that demand quite well for all the varieties of living organisms that inhabit this planet. We humans are given short shrift though, just a mention under *hominidae*, and the closest picture is that of a gorilla. That's OK; we have our own CD-ROMs.

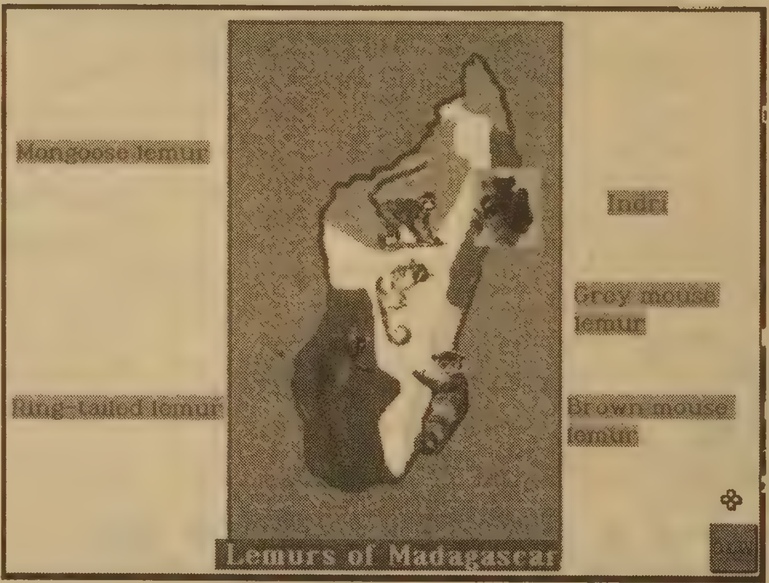


Dictionary of the Living World

Giraffidae
(Giraffes)

Family. Infraorder 2, Suborder 1, Order 34 of class Mammalia (subclass 2 Theria).

Giraffes, okapis. Neck and legs very long; Africa. *Giraffa camelopardalis,* giraffe, 5.5 to 6 m (18 to 20 ft) tall, head with 2 to 6 skin-covered 'horns'; browses on foliage of mimosa and other trees; *Okapia,* okapi, smaller, neck shorter.



Top: The Dictionary of the Living World is a multimedia compendium of all living organisms by their scientific nomenclature. Bottom: In this animated map from The Dictionary of the Living World, the habitat distribution of a species is shown.

The Dictionary of the Living World has facts, illustrations, photos, maps, movies, and animations on over five thousand animal species. There are several very good CD-ROMs on nature that are designed for kids, such as The Animals from Software Toolworks, but this is not one of them. It's a very solid scientifically oriented reference, in which the index of names does not list things as "antelopes" or "brain corals," but arranged under the Latinate terms of species, phylum, and genus. You can use the search function to find "katydid," "heron," or "chanterelle" directly, but everything is organized in terms of its place in the structure of scientific denotation.

High school or college students would be lucky to have this CD as part of their study materials, but it is clear and accessible enough to act as an authoritative reference for the generalist and the browser. This dictionary is built on HyperCard and Macromedia Director, with QuickTime motion documents. It has a nice feature wherein you can click up the thumbnail of a photo under a list, such as for Poisons, and then go to the full size photo there or under the subject's entry. Movies and animations are used well, but the control bars are not made available either for the QuickTime movies or the animations. There are some exceptions, such as the Director animation of a hummingbird's flight where you can choose different frame rates. Especially in science topics like these, you should be able to analyze the motion with control.

The interface works fairly well, although you can find yourself in a dead-end selection with no active buttons to get out, forcing you to go up to the HyperCard menu to bail. The habitats distribution map feature, where you see a world map with a filled area, is very pertinent and revealing. A collection feature allows you to make a scrolling list of collected words. The sound clips are generously long-lasting, compared to the brief sound bites in some other titles. Now, at last, I know the true tenor of a hedgehog's voice.

BRANCHING OUT ON THE TREE OF KNOWLEDGE

More and more CD-ROMs are now available, giving you more choices on expanding your electronic and cerebral horizons. As varied as the books you buy, CD-ROMs offer different levels of depth and information, as exemplified by these new Sierra Club Electronic Guides from InterOptica. *7 Natural Wonders* in Mac or Windows versions at $99.95 is a detailed and thorough examination of seven different natural "wonders"—The Grand Canyon, the Amazon rain forest, Mount Everest, the Great Barrier Reef, the Indian Monsoon, the Blue Whale, and the East African Wildebeest Migrations. Each one of these topics is available in a standalone version for both Mac and Windows at $24.95.

Here are very multimedia-rich approaches to learning about complex subjects, with narrated overviews, video clips, interactive text and maps, guided tours, glossaries, and even a quiz. For instance, in the Grand Canyon chapter I found everything I'd want to know about it before visiting that area. All the geo- and ecological features were explained in text, animated maps, and diagrams. The plant and animal life, the folklore and legends, and the history of both the Native Americans and the settlers was covered. Though QuickTime movies are still a little rough, they and the full-resolution photos conveyed a sense of the different locations.

The CD's one deficiency is the audio. In the Amazon chapter I clicked on the video for the Kuikuro flute dance. But instead of the native tones they were dancing to, I

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DICTIONARIES OF THE LIVING WORDS

The CD-ROM version of the Random House Unabridged Dictionary, Second Edition, which is compatible with DOS, Windows, and Macintosh on the same disc, contains all the text entries appearing in the book. It has one thousand new words that have entered the language since 1987, fifteen hundred revised entries and definitions, over 315,000 A–Z entries, etymologies, pronunciation notes, and more than seventy-five thousand example phrases and sentences.

The dictionary has a self-installing desk accessory that helps you access it while you are in another application. I have it up now as I write. Its interface is very well designed, with the text of the defined word picked out in blue and the pronunciation in green. It features wildcard and anagram searches, and a very good preview of guesses. It is a very complete and substantial reference and quite fast.

Just as the Random House Unabridged Dictionary goes many leagues beyond the built-in Merriam-Webster Intermediate Dictionary of the Compton's Interactive Encyclopedia, the Oxford English Dictionary (OED) from the Oxford University Press goes far beyond Random. The CD-ROM version of the $2750 twenty-volume set of the OED lists for $895. But this is really the Genome Project of dictionaries, and may be too unwieldy for most mortals.

VERY FINE PRINT

Who said that digital is against print? Both Compton's and Random House offer terrific, mind-enhancing deals that provide the owner of the CD-ROM version with the ability to add the traditional print version of the reference to their libraries. You can get the $499 twenty-six-volume *Compton's Encyclopedia* for $99 plus $29.95 for shipping with proof of purchase. The CD-ROM version of the Random House Unabridged Dictionary is $79, but for $159 you can get both the disc and the massively impressive traditional $100 paper edition. Unlike the CD-ROM, the 2800-page book also contains twenty-four hundred illustrations and spot maps; a basic manual of style; concise French, German, Italian, and Spanish dictionaries; a guide to signs and symbols; a listing of colleges and universities; and seventy-five hundred bibliographical entries. All of the above can be more helpful tools for the smartening-up of Clinton-era America. ■

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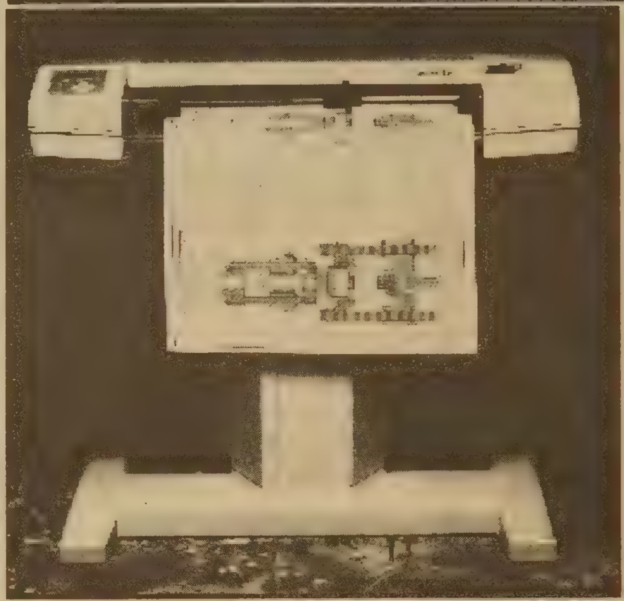

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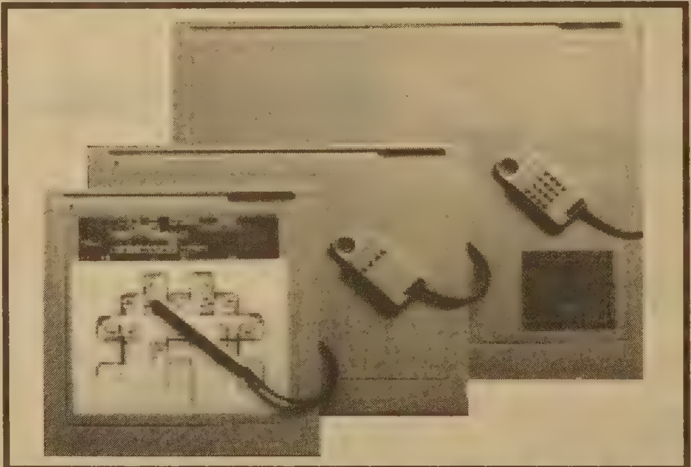

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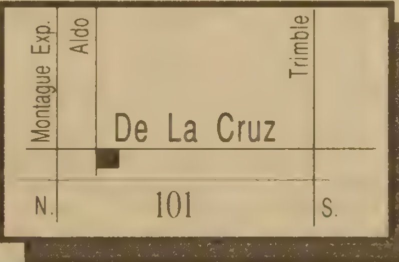

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Multi & Media beyond

Amigas And PCs:

A Comparative Look

If You Want To Work In Multimedia, "Nonstandard" Might Be Better . . .

BY DOUGLAS J. NAKAKIHARA

Following last month's look at NewTek's Video Toaster, it seems appropriate to spend some time on the computer that makes it all possible: the Commodore Amiga.

To provide a frame of reference, I'm going to compare it to an IBM compatible running Microsoft Windows 3.1, which I'll generically refer to as a "PC."

THE PC'S SUCCESS

Why is the PC so successful? On the surface, the obvious answer is price. However, it goes much deeper than that.

The PC platform provides an open architecture, while the Amiga has always been very closed. Although IBM has totally lost control of the architecture it created, competition between the many rival IBM clone makers has rapidly driven technology higher and prices lower. Commodore, on the other hand, has sole control over its platform, but the Amiga's installed base has not prospered the way the PC's has. (Apple is finding a similar result with the Macintosh.)

Another thing propelling the PC is comfort level. Buying a computer can be a harrowing experience these days. There are just too many choices even if you know which platform you want, and it's so easy to buy the same computer you use at work, or the same one your friend has. Technical support is also more readily available.

In general, the huge PC market means more software and hardware development, greater availability of product, and cheaper prices. This has a downside—because no single entity is controlling the PC architecture, there's a myriad of incompatible standards. Much of this is due to hardware developers trying to get around the limitations of the architecture, all believing their way is best. The confusion is about to increase ten fold as Microsoft begins to port Windows NT to non-Intel-based PCs.

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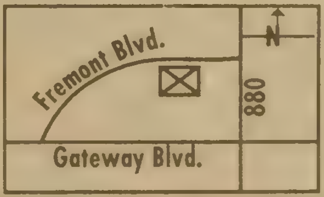

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Both platforms use a graphical user interface. However, operationally, about the only thing that Windows' Program Manager and the Amiga's Workbench share is icons.

A major difference between the two is that with Windows, icons have no relationship to the file directory structure. With the Amiga, icons represent actual disks, files, or directories. Thus, if you are already familiar with directory and subdirectory hierarchy, the Workbench is very intuitive. You can graphically perform file management right on the Workbench. Delete an icon in Windows and the underlying file remains intact. Delete an icon on the Workbench and the underlying file is deleted. Windows relies on another program, the File Manager, for any procedure involving file structure.

> If you must specifically run Excel, Word, Lotus, etc., you have no choice but to get a PC. However if you only need spreadsheet and word processing capabilities, the Amiga may be a worthwhile solution.

The Amiga enjoys a very fluid operating system; Windows, in spite of all its power, is anything but fluid. In AmigaDOS you can switch between tasks and never encounter any pausing for disk access. Multiple programs run simultaneously with minimal impact on each other. In the event that a program crashes it rarely brings down the entire system. Amazingly, the operating system requires only 512K of RAM—one-half meg—and boots in a matter of seconds. Moreover, most Amiga expansion cards automatically configure themselves so you don't have to worry about interrupt conflicts—it's plug and play. The Amiga's thirty-character filename limit is also an advantage.

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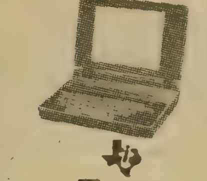

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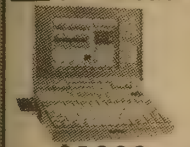

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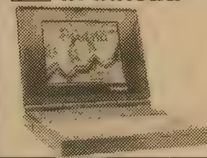

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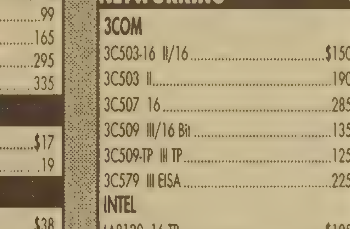

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dynamically determines which applications get to run. With cooperative multitasking, the applications run the show. CPU time is more efficiently allocated with preemptive multitasking, resulting in significantly better overall performance.

You're wondering why you need to multitask, aside from, perhaps, background printing. Well, let's say you're working on a report using a word processor. Since you always work better listening to some music, you're playing some songs you composed using the Amiga's four-channel audio. And, like all conscientious computer users you're also backing up your hard drive to a tape drive.

Suddenly you remember that your friend was supposed to email you some information for your report. You fire up your modem and log onto your BBS. Luckily your friend's message is there, so you capture it to a file. You also notice a few interesting public domain programs, so you start to download them. While downloading, you merge the captured text into your report and work on it a little more.

Finally, the first file is downloaded, but the second is not finished yet. Since the file is compressed, you decompress it using a utility program. Flipping to the backup program screen, you note that it's only half completed. After reading the decompressed documentation file you are sure your neighbor would love to see it. Of course you have no empty formatted disks, so you place a blank disk into your floppy drive and format it. A quick check of the download shows that it's done, so you log off the BBS. By this time the floppy is complete so you copy the relevant files over.

You might find this example farfetched, but I do this kind of thing all of the time. Once you get used to real multitasking, you'll find it a godsend. This example could not be done with Microsoft Windows 3.1.

Preemptive multitasking also allows a very powerful language called ARexx to really shine. On a very basic level, ARexx is similar to a macro, like the ones in Lotus 1-2-3. However, it goes far beyond that, allowing one program to control other programs to create a symphony of applications all dynamically interacting in concert with each other. This lets you combine presentation programs with audio, database, serial and infrared controlled peripherals, image processing, and video applications. Nearly every Amiga program worth its salt supports ARexx.

PRODUCTIVITY PROGRAMS

Most people, I'd guess, buy PCs to run two main types of programs: a word processor and a spreadsheet. If you are hoping for an Amiga version of Word, WordPerfect, Lotus 1-2-3, or Excel, you'll find that none of the major PC developers have ported their wares to the tiny Amiga market. However, you'll find Amiga word processors, spreadsheets, and desktop publishing programs that will satisfy 99% of the average computer user's needs. Additionally, Amiga

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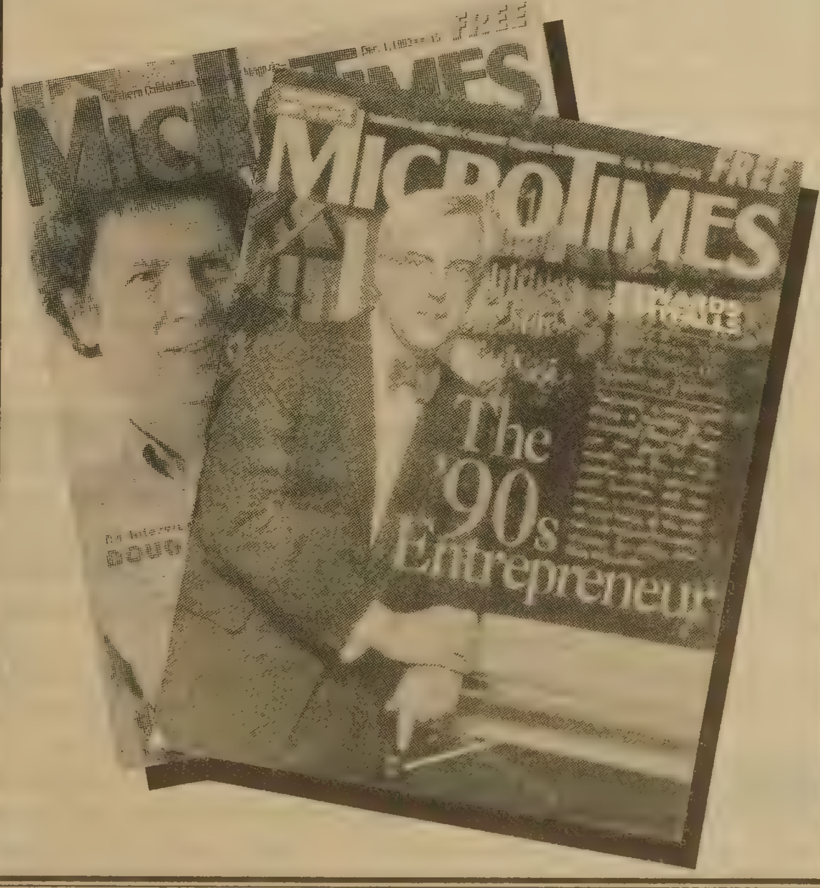

> In AmigaDOS you can switch between tasks and never encounter any pausing for disk access. Multiple programs run simultaneously with minimal impact on each other. In the event that a program crashes it rarely brings down the entire system.

software is generally cheaper than similar PC software.

The Amiga has hardware and software emulators for Mac and PC. However, I'm not convinced that they are cost- and performance-effective solutions, considering how inexpensive the real McCoys have become.

GRAPHICS AND VIDEO

Whatever the Amiga lacks in productivity titles, it more than makes up in graphics and video capabilities. However, the stock statement that "the Amiga was made to do video and is therefore better at it" is all but untrue today, due to add-on hardware now available for the PC. But because the Amiga, in its native state, supports video resolutions and interlacing, it's certainly easier and cheaper to use an Amiga for video.

With an inexpensive Amiga 1200 alone, you could easily create some spectacular animations to spice up your home videos. If you wanted to get tricky, your computer graphics could be placed over your video footage using a genlock. You can also do the opposite and place video over computer graphics weatherman-style using a special keying device.

Playback is also an important issue. Without expensive additional add-on hardware, a PC cannot match the animation capabilities of the Amiga. Most PC animations only use 256 colors, where the Amiga can animate using a thousand times that!

Of course I have to mention the Video Toaster. Nothing else on any platform can match all of this video wonder's capabilities. Broadcast-quality video editing, character generation, 3-D animation, etc.—the Toaster does it all! (See last month's issue for more details.)

ENTERTAINMENT

Entertainment titles are grabbing more and more of the PC software market. However, fast-paced Nintendo-style games are generally not available on the PC. The hardware is not up to the task—it wasn't designed to do it. You don't see anyone trying to repackage an IBM compatible into a game console like Commodore is doing with CD32, the soon-to-be-released Amiga console; it would either be too slow or too expensive.

Great arcade-action games require fast graphics and great audio. The Amiga offers both and always has. The Amiga's problem here is the same as in the productivity area: The smaller Amiga market has fewer titles. However, many of the available games are superb.

MULTIMEDIA

Is it really such a big deal that you can show a jerky miniature "movie" on a computer screen? Why not just buy a laserdisc player? State-of-the-art PC multimedia would be laughed at, if broadcast on TV.

If you really want to do live or taped presentations that combine "multiple media" like animations, graphics, sound, laserdiscs, etc., the Amiga is hard to beat. In my opinion it surpasses what's available in the PC market for three reasons: 1) graphics performance; 2) multitasking capabilities; and 3) price. For around $1000, you could have a very powerful presentation system based around an Amiga 1200.

AMIGA MODELS

There are currently only two Amiga computers in production: the Amiga 4000 and 1200. The Amiga 4000 is available with either a 25MHz Motorola 68040 or 68030 CPU. This desktop computer has expansion slots and comes with a 120MB hard drive. Memory is limited to 18MB on the motherboard, but can be expanded via expansion cards. Resolutions up to 1280 x 480 as well as 800 x 600 are available with 256,000 colors. Four channel 8-bit audio is built in; 24-bit color boards and 16-bit audio cards can also be added via expansion slots. The 1200 is a slotless version that uses a 14MHz 68020.

One word about the audio. Although its sound is only 8-bit, the Amiga supports direct to disk wave form sampling and playback. Many IBM-compatible sound cards are limited to synthesized sound reproduction and thus cannot play real-world sounds. (As a testament to the high quality of the Amiga's audio, a song I'd composed using only the Amiga's built-in audio was played on KPWR Power 106 in Los Angeles. I'm sure they thought I used a lot of expensive equipment.)

THE FUTURE

On the PC software side, Microsoft is addressing many of Windows' deficiencies in the next release. However, it remains to be seen how well the new version deals with such issues as real-world hardware requirements and backward compatibility. On the PC hardware front, the only thing you can count on is that the tide of the confusing sea of standards will continue to rise. For the Amiga, the next generation hardware is just around the corner, with significantly enhanced graphics and audio performance.

CONCLUSIONS

There is no way to discuss all of the differences between the two platforms. However, I've tried to highlight the major functional differences that really matter to the user. I should note that the two platforms do share many of the same peripherals like printers, hard drives, modems, etc.

The bottom line is that you need to define your needs. If you must specifically run Excel, Word, Lotus, etc., you have no choice but to get a PC. However, if you only need, for example, spreadsheet and word processing capabilities, the Amiga may be a worthwhile solution, especially if you also are interested in affordable high-performance graphics and video applications. It will take a little more work, but try to check out what the Amiga has to offer, especially if you are looking for a second computer. Incidentally, if you start asking around about Amigas, make sure the person you talk with really knows Amigas. I have heard many "computer" salespersons spout off ignorant half-truths about the Amiga. ■

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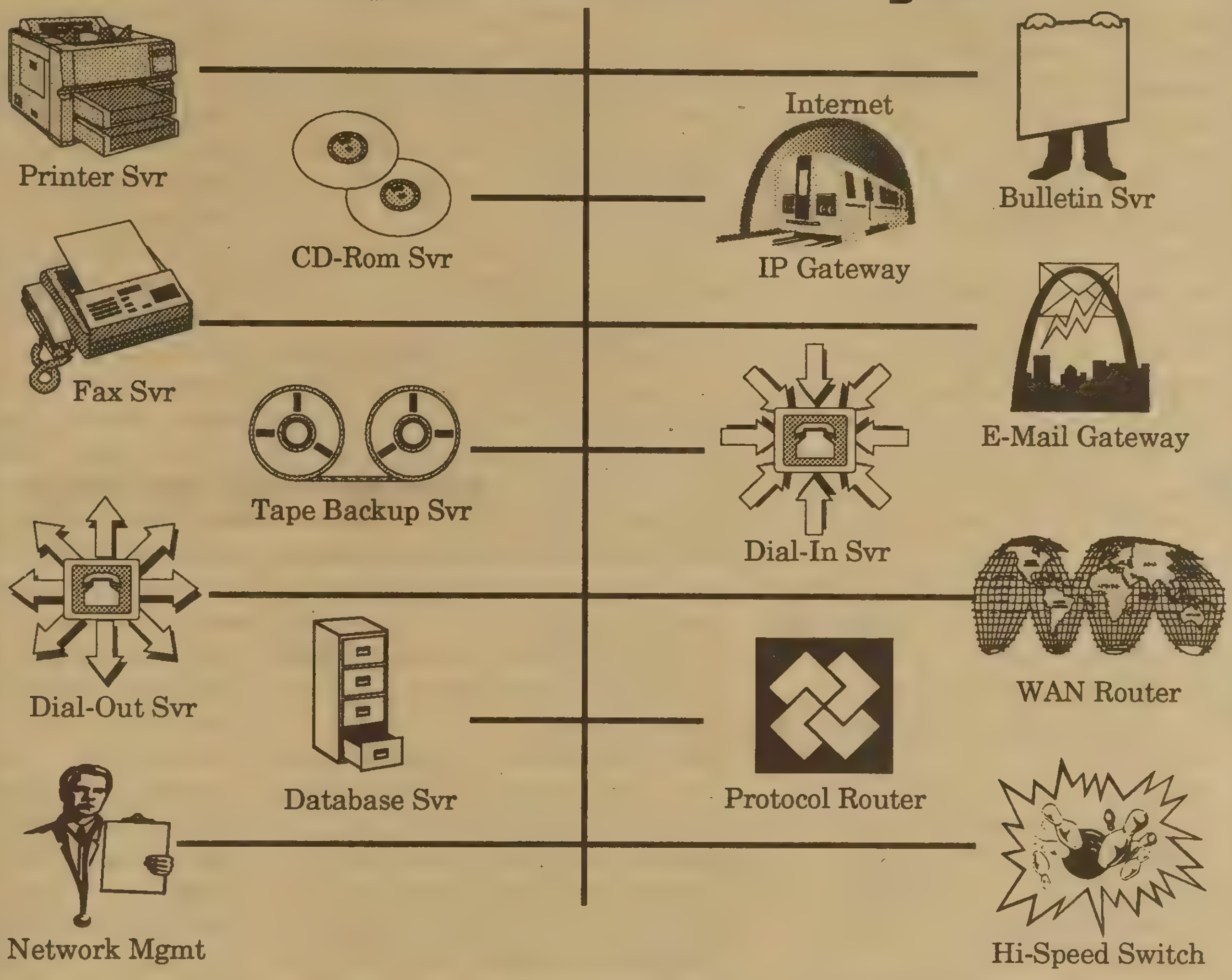

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- **On-Site Hardware Trouble-Shooting**
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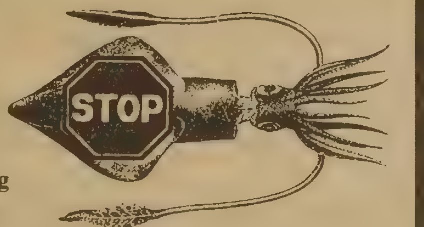
- **Maintenance Contract**
- **Carry-In Hardware Repair**



NAC Engineering & Service Department is composed of veterans in UNIX, Windows, Macintosh, WAN, and a group of CNEs.

COMPAQ File Server

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- . Compaq Fast SCSI-2 host adapter
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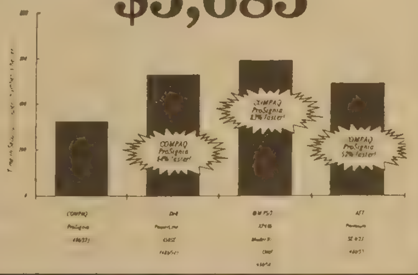

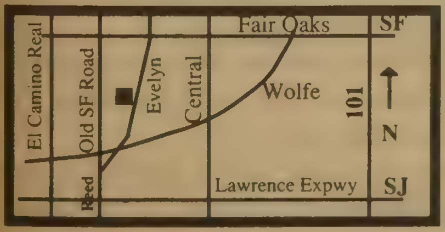

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Calendar Of Events *continued from page 254*

Francisco. Cyber Training Services. Call: (415)974-7200.

February 21–22 PC Repair 2-Day Hands-On Workshop. Oakland. Excel Micro Solutions. Call: (510)836-2040.

February 21 & 25 Macromedia Director Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 22 Adobe Illustrator II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 22 Advanced Microsoft Word Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 22 Advanced QuarkXPress Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 22 DSP Control Workshop. San Jose. Texas Instruments. Call: (408)383-2363.

February 22 Intermediate Lotus 1-2-3 4.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 22 Intermediate Paradox 4.5 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 22 Intermediate WordPerfect For Windows 5.2 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 22 Macintosh Basics I Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 22 Microsoft Excel II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 22–23 Microsoft Access Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 22–24 Autodesk Animator Pro Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 22 & 24 Beginning FileMaker Pro Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 22 & 24 Intro To The Mac Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 22–March 1 QuarkXPress Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 22–March 8 Adobe Illustrator Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 22–March 22 3D Studio Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 23 Advanced Excel Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 23 Beginning Freehand Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 23 Illustrator For Windows Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 23 Intermediate Word For Windows 2.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 23 Intermediate WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 23 Intro To Ami Pro 3.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 23 Intro To Word For Windows 6.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 23 Macintosh Basics II Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 23 Microsoft Access Part 2 Class. Santa Clara. Infotec Training Institute. Call: 1-800-282-7990.

February 24 Advanced Photoshop Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 24 FoxPro For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 24 Intermediate Excel For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 24 Intermediate Lotus 1-2-3 3.4 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 24 Lotus Notes System Administration II Class. Santa Clara. Infotec Training Institute. Call: 1-800-282-7990.

February 24 Mac Basics Level 1 Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 24 Mac Basics Level II Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 24 Microsoft Excel Macros Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 24 Microsoft Word I Class. San Francisco. Media Alliance. Call: (415)771-7133.

February 24–25 Intro To Networks Hands-On Workshop. Oakland. Excel Micro Solutions. Call: (510)836-2040.

February 25 Advanced PowerPoint Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 25 Advanced WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 25 Freehand For Windows Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 25 Intermediate Lotus 1-2-3 3.4 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 25 Intermediate WordPerfect For Windows 6.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 25 Intro To WordPerfect 5.1 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 25 Mastering Windows For Experienced Users Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 25 WordPerfect/DOS Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 25 & 28 MacProject Pro Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 25 & March 4 3D Made Easy Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 25–March 4 Director 2 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 26 Computer Show & Sale. Santa Clara County Fairgrounds. Richard James. Call: 1-800-685-1400.

February 26 PBX Switching Systems Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 26 & March 5 & 12 Getting Started With MacroMedia Director Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 27 Computer Show & Sale. Cal Expo, Sacramento. Richard James. Call: 1-800-685-1400.

February 27–March 27 Exploring HyperCard Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 28 Free Multimedia: Productivity Tools For Office Automation Class. San Francisco. Network Services Group. Call: (415)863-8407.

February 28 Intermediate Excel For Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

February 28 Intermediate Paradox 4.0/4.5 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 28 Intermediate Quattro Pro 4.0 Class. San Francisco. The Dublin Group. Call: 1-800-464-8344.

February 28 Intro To PowerPoint 3.0 Class. Santa Clara. The Dublin Group. Call: 1-800-464-8344.

February 28 Lotus Notes System Administration I Class. San Francisco.

From motors to modems, you can find it all at HSC!

Al Gore has called for the creation of a Data Superhighway, and HSC can provide you with the tools to take your driving lessons! Check out the great modem values this month!

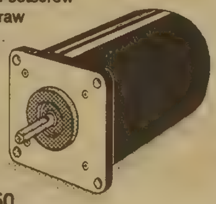
Get Motivated!

Two nice, heavy-duty motors for the hobbyist who needs to get something moving!

A. 12VDC two-speed reversible motor, 3" dia. x 4.5" long with a .5" long shaft. It will provide up to 30 oz.-in. of torque at 2700 RPM, unloaded speed is closer to 5000 RPM. Depending on load they draw anywhere from 5 to 9 amps. The .31" (5/16") dia. shaft is cut with gear teeth, but you could still put a pulley or gear with a set-screw on it. Generous 33" long leads are color-coded for easy hook-up. Connection diagram and torque curve chart provided. New, somewhat dusty.

HSC# 13617 $7.95

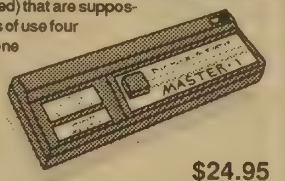
B. Beautiful 115VAC Synchronous motor by Bodine. These new-in-box "HY-Sync" reversible motors (type 42TIBEHY) are just the thing for that application requiring a high-torque slow spinning motor (72 RPM at 60 Hz.) The mounting flange is 4.25" square, with .25" holes on 3.5" mounting centers. The overall length from the mounting face is 5.5" and it has 28" long color coded leads. The .375" dia. shaft is 1" long and has two flats at 90° for dual-setscrew gears or pulleys. The current draw is about .6A and a 9µF starting capacitor and 200 Ω 100W resistor are required when connecting. We will include a capacitor with each motor, but we haven't found the power resistors yet. Figure on a couple of bucks when we do.



HSC# 14606 $32.50

Chernobyl Fallout?

What else could it be when the Russians gear up to build many thousands of these personal radiation dosimeters? They were obviously meant for mass-consumption, as they are blister-packed on a hanger card! It is also telling that some of the packs have instructions in Finnish and Swedish! These pocket-sized (5" x 1.75" x .75") units are frankly not as high in build quality as the Soviet microscopes we were selling a year ago, but they do seem to count gamma radiation exposure from .01 to 9.99 micro-Siewerts per hour (One micro-Siewert = 100 micro-Roentgens). According to the instructions, the maximum admissable safe radiation level is .1 to .6 µSv/h. The instrument uses four commonly available button cells (Russian ones included) that are supposedly good for about 2 years of use four times a day. We opened one of the units up and were interested to find Russian IC's inside...Hmm, do they have a Silicon Valley in Russia?



HSC# 80123 $24.95

New - Lower Price!

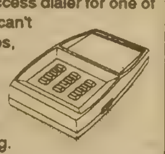
Laser for the Timid

Finally, a Helium-Neon (red) laser for those who are shy about handling high voltage... a self-contained tube/power supply unit that runs off low voltage! Just give it 900 mA of 12VDC and you get 1mW out! Plastic case is 6.25" x 1.25" x 2.25" with 2" power lead. Probably pulls but all are tested good. Great beam quality!

HSC# 14475 $69.95

One-trick Phone Friend

This little novelty was meant as an easy-access dialer for one of the off-brand long distance services. You can't change the pre-programmed access codes, but it will remember the last number you dialed with it, so you could use it as a one-number (16-digits) memory re-dialer. Handy for those midnight overseas calls! Uses three button cells which might need replacing.



HSC# 14438 $4.95

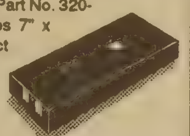
Board Level Bargains!

Special deals on Everex computer related PC board assemblies:

1. **2400 Baud Modem** (RS-232 external type) 3.25" x 6", no enclosure avail. Hayes compat., new, fully assembled PC Board, requires 8-12VDC power adaptor. **HSC# 14467 $8.95**
2. **4800 Baud FAX/Modem Board** (RS-232 external type), 9.5" x 6.25", no enclosure avail. Hayes compat., new, fully assembled PC Board, needs 12VAC, software included. **HSC# 14505 $14.95**
3. **Mini-Magic Memory Card** - adds up to 576K of RAM to XT bus machines (RAM not included) **HSC# 14593 $4.95**

Battery Monolith

These new-in-box rechargeable Ni-Cd battery packs appear to be used in Zeos lap-top computers. Zeos Part No. 320-0008-00, 12 VDC 1700mAh, measures 7" x 2.75" x .75" and has .375" square contact pads. Use it to power your 12VDC projects, or turn it over and film your own version of "2001: a Space Odyssey"!



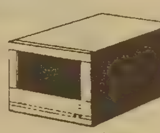
HSC# 14454 $12.50

Let HSC be your SCSI Hardware Headquarters!

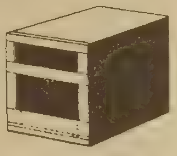
All drive enclosures feature fan-cooled power supplies, SCSI address switches and ICN50 connector knockouts. Styles A&B include ribbon cable, the others do not. Inquire about our selection of SCSI cables when ordering.

A.	SKHD1	55W P.S.,	Room for single internal drive, fits under a Mac!	10" x 10" x 2.25"	$99.95
B.	SKHD1/Open	55W P.S.,	Same as above, but with 5.25" front opening	10" x 10" x 2.25"	$99.95
C.	SLHD2	60W P.S.,	Front opening for two half-height drives.	7.5" x 12" x 6.5"	$119.95
D.	SLHD3	60W P.S.,	Front openings for three half height drives	7.5" x 12 x 9"	$139.95

Style "A" & "B"



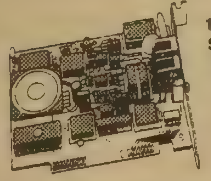
Style "C"



Style "D"

Modems for the Masses!

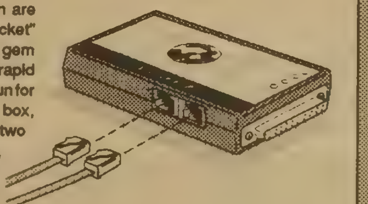
Yes, technology keeps forging ahead, which means that some items get left behind, but that also means they get very affordable! These modems are not the latest 14,400 bps V.32bis with fax and voice message capability, but they definitely have a price advantage. If you aren't sure yet if you want to wade into the on-line world, here are some entry-level ways to try it out!



1. Rock-bottom pricing on internal modem cards...1200 bps for only $4.95! New-in-box Everex Evercom-12 internal short card modem (similar to illustration at left) comes with Bit-Com communications software, manual and telco cable, and as a bonus there is a starter pack for "America Online" that offers a free trial of this popular dial-up service for a month. That's a $9.95 value, and you get 10 free hours to try it out. There can't be a cheaper way to test drive the Data Highway!

HSC# 14592 $4.95

2. Slightly more exotic powers of communication are yours when you acquire the PCI Travelcom "pocket" modem shown below. This tiny (2.75" x 4.75" x 1") gem is perfect for laptops on the go! It communicates at a rapid 9600 bps (V.32) with MNP error correction, and will run for 2 -3 hours on a 9V battery. These are new in the box, come with a manual, AC Adaptor, telco cable and two serial adaptor cables (one for IBM and one for Mac), as well as your first battery! Now you don't need to leave the Data Highway when you're on the road!



HSC# 14583 $89.95

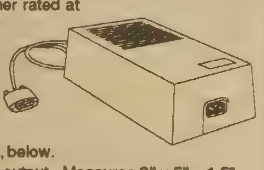
Miscellaneous Data Communications Devices (not shown, very limited quantities available):

3. **Everex Evercom II-24 Modem for PS/2** - MicroChannel Bus- 2400 bps, new in box, Hayes compatible, comes with Bit-Com software (3.5" diskette), manuals, telco cable. HSC#14591 $19.95
4. **Everex Everfax 24/96E External Fax/Modem** - 2400 bps modem, 4800/9600 bps fax, new in box, comes with ProComm and E/Fax software, manuals, AC adaptor, cables. HSC#96067 $49.00
5. **Everex Evercom 24E External Modem** - 2400 bps, new in box, comes with Bit-Com software, manuals, AC Adaptor, telco cable. HSC# 96069 $24.95
6. **Abaton Interfax (by Everex) Fax/Modem for Mac** - 2400 bps modem, 4800/9600 bps fax, new in box, comes with software, cables, AC Adaptor. HSC#96071 $49.00 Also available with 220VAC adaptor for $42.50

Power Supply Project Starters

Nearly any electronic project you do these days is going to need 5, 12 and -12 voltsin order to wake up and dance, so here are some handy powersupplies already built and ready to go:

A. Enclosed supply (illustrated at right) has small Astec switcher rated at 5VDC @ 3A, +12VDC @ .65A and -12VDC @ .15A in a case measuring 4" x 6.5" x 2.5" with a DE9 female plug as the output. Uses standard IEC line cord (not included). Wired for 220 VAC input, we show you which jumper to move for 110 operation. Remove it from the case and it is similar to "C" below.

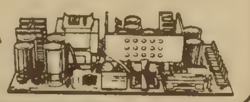


HSC#14579 $9.95

B. Open frame Protek switcher, new, similar to illustration at right, below. 110/220VAC input, 5VDC @ 3A, 12VDC @ 2A, -12VDC @ .3A output. Measures 3" x 5" x 1.5"

HSC #13728 $14.95

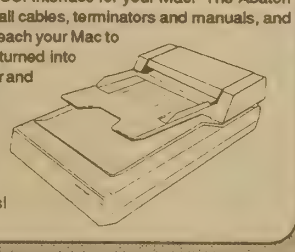
C. Open frame Astec switcher, new, similar to illust. at right. 110/220VAC input, 5VDC @ 2.5A, 12VDC @ 2A, -12VDC @ .1A Three output connectors for 3.5" disc drives. Size 4" x 6.25" x 1.75"



HSC #14483 $19.95

Flatbed Scanners for Apples!

No, we don't think you could put an apple under the lid and scan it into your computer! We're talking about a 300 dpi monochrome scanner with an embedded SCSI interface for your Mac! The Abaton TranScribe 300 has a 8.5" x 11.75" scanning area, includes all cables, terminators and manuals, and best of all comes with Omnitype OCR software, so you can teach your Mac to read! That's right, if you have lots of documents you want turned into computer files, simply load them into the included sheet feeder and scan them in. No more retyping text into your computer! New in the box, all you need to do is attach the sheet feeder.



HSC# 14595 $249.00

Also available separately, the sheet feeder for these scanners, incase you already have an Abaton Transcribe 300, or just want to play with lots of cool motors, belts & gears!

HSC#14601 $29.95

The Good Old Days...RF Parts Bargain!

Some younger enthusiasts may find this hard to believe, but hobbyists of yore actually used to get excited over finding circuit boards with interesting parts to unsolder! We're hoping there are still some people who appreciate this practice because we have some RF Network boards that have gobs of neat stuff...two Motorola MC145156P1 Synthesizer Chips, three Mini Circuits Labs SBL-1 Balanced Mixers, four VHF High-band Bandpass Filters, three SL560C 300MHz Lo-noise Pre-amp IC's, an FM Detector section built around an LM3089, a 3N211 FET, lots of Toko adjustable coils, etc. HSC# 14581 $4.95

Halted specialties co. **HSC** **Electronic Supply**

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4837 Amber Ln., Sacramento, CA 95841 (916) 338-2545
6819 Redwood Dr., Cotati, CA 94931 (707) 792-2277

Terms: Some quantities limited; all items subject to prior sale. **Minimum order: $10.00 plus shipping.** Orders under $20.00 subject to $2.00 handling fee, in addition to shipping All orders shipped FOB Santa Clara, CA (this means you pay freight!) by UPS Surface (no P.O. Boxes) unless otherwise specified, in which case prevailing carrier rate plus $5.00 handling fee applies. Prepaid orders that don't include shipping charges will be shipped freight COD. There is a $4.00 UPS charge added to shipping charges for COD shipments. If you have questions about your order, please call Customer Service at (408) 732-1854 M-F 9AM to 5PM PST.

Calendar Of Events continued

Infotec Training Institute. Call: 1-800-282-7990.

February 28 Lotus Notes Technical User Class. Santa Clara. Infotec Training Institute. Call: 1-800-282-7990.

February 28 Macromedia Director Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 28–March 1 Asymetrix Toolbook For Windows On The IBM PC Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

February 28–March 4 [701]NetWare Service & Support Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

February 28 & March 7 Lotus 1-2-3 For DOS Level 1 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 28 & March 7 QuarkXPress 3.1 Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 28 & March 7 WordPerfect For Windows Level 2 Class. San Jose. Mentor Training. Call: (408)433-0990.

February 28–March 16 Photoshop 3 & 4 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

February 28–March 21 Photoshop 1 & 2 Class. San Francisco. Center for Electronic Art. Call: (415)956-6500.

MARCH

March 1 Advanced Freehand Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 1 Beginning PageMaker Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 1 Claris FileMaker Pro I Class. San Francisco. Media Alliance. Call: (415)771-7133.

March 1 Free Remote Powerbook Office Class. San Francisco. Network Services Group. Call: (415)863-8407.

March 1 Intro To Lotus 1-2-3 Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

March 1 TMS320C3x Design Workshop. San Jose. Texas Instruments. Call: (408)383-2363.

March 1–2 Basic 2D AutoCAD Workshop. Santa Clara. The Copper Connection, Inc. Call: (408)970-9838.

March 1–3 Advanced Programming Using Microsoft Access Class. Santa Clara. Infotec Training Institute. Call: 1-800-282-7990.

March 1–3 Intro To Programming For Windows Using MIS Visual Basic Class. San Francisco. Infotec Training Institute. Call: 1-800-282-7990.

March 1–6 Autodesk 3D Studio Basics Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 1–24 Intro To AutoCAD Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 1 & 24 Quark For Windows Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 1 & 24 Quattro Pro/DOS Level 1 Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 2 Free Do Windows For Lunch—Databases Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 2 Free Multimedia Studies Program Information Session. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 2 Intro To WordPerfect Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

March 2 Lotus Notes System Administration I Class. San Francisco. Infotec Training Institute. Call: 1-800-282-7990.

March 2 Lotus Notes System Administration II Class. San Francisco. Infotec Training Institute. Call: 1-800-282-7990.

March 2 MacProject Pro Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 2 WordPerfect/DOS Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 2–3 Microsoft Project For The Mac Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 2 & 24 Microsoft Word For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 2–April 27 Electronic Music And Interactive Multimedia Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 3 Adobe Illustrator Class. San Francisco. Media Alliance. Call: (415)771-7133.

March 3 FileMaker Pro For Windows Level 1 Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 3 FoxPro For Windows Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 3 Intro To Windows Class. Walnut Creek. Computer Education Center. Call: (510)937-2566.

March 3 Microsoft Word II Class. San Francisco. Media Alliance. Call: (415)771-7133.

March 3–4 Intermediate 2D AutoCAD Workshop. Santa Clara. The Copper Connection, Inc. Call: (408)970-9838.

March 3–May 5 Instructional Design For Multimedia Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 4 Beginning FileMaker Pro Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 4 Lotus 1-2-3 For Windows Level I Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 4 PowerPoint For Windows Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 4 & 9 Macromedia Director Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 5 Advanced Quark Class. San Francisco. Media Alliance. Call: (415)771-7133.

March 5 Careers In Multimedia Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 5 Intro To Data Communications Networks Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 5–April 17 Home Movies QuickTime Workshop. San Francisco. Life on the Water. Call: (415)864-3547.

March 7–11 The Complete Excel Class. San Francisco. San Francisco State Extension. Call: (415)904-7700.

March 15 Field Programmable Gate Array Design Workshop. San Jose. Texas Instruments. Call: (408)383-2363.

March 21 Intro To Mac Networks Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 21–22 USENIX/SAGE Security & System Administration Management Seminars. San Francisco. USENIX. Call: (510)528-8649.

March 22 WordPerfect/Windows Level II Class. San Francisco. Cyber Training Services. Call: (415)974-7200.

March 30–31 Technology Update: Client/Server, Downsizing CASE And Database Seminar. Santa Clara. DCI. Call: (508)470-3880.

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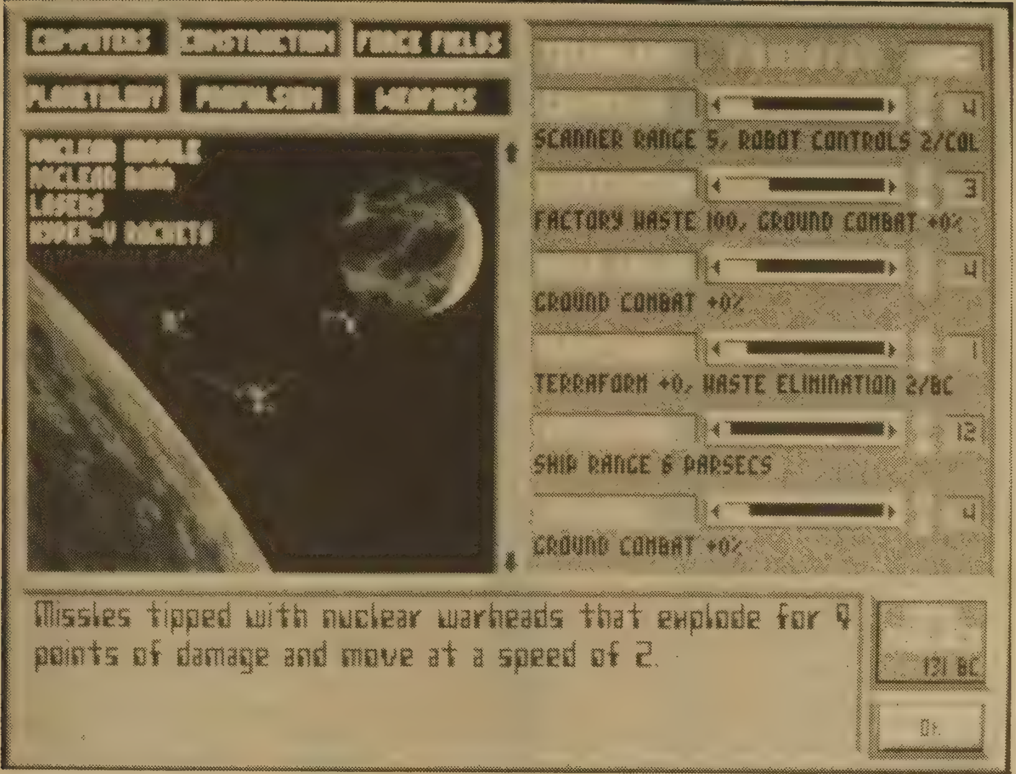

Missles tipped with nuclear warheads that explode for 9 points of damage and move at a speed of 2.

Dungeon Hack does with 256 colors. If you happen accross that shareware classic, give it a try. (Strategic Simulations, Inc., 675 Almanor Ave., Ste. 201, Sunnyvale, CA 94086. 408/737-6800)

MASTER OF ORION

Designed By: Stephen Barcia
Produced By: Simtex Software
Published By: Microprose Software
For: MS-DOS 3.3+ (2MB RAM, VGA graphics; optional mouse; sound: Sound Blaster Pro+Adlib+Roland+Pro Audio Spectrum)
List Price: $44.99
Reviewed By: Fred Haslam

In space, no one can hear you plead.

Master of Orion is a sophisticated strategy game of interstellar conflict. Like most space strategy games this has exploration, production, research, ship design, and combat. This differs from most space games in its use of alien powers, detailed diplomacy, and computer personalities. Together with a robotic Walter Cronkite delivering the galactic news, these differences make Master of Orion a better than average wargame.

There are ten alien races, each with its own graphics and racial abilities. Humans have a bonus with diplomacy, while the Psilons are masters of research and the Bulrathi excell in ground assaults. The powers are both balanced and unbalanced in a paper-scissors-stone effect. Human diplomats keep them out of conflicts that would bury another race. Bulrathi are excellent in the short term, but Psilons will dominate given time to develop technology.

Diplomatic negotiations can keep you out of wars or get you into them. It's relatively easy to convince another race to join you in an attack, but difficult to get them to ally with you. By negotiating trade agreements, two races can improve both their economies. Long-term trade agreements tend to bring two races closer together since they both have more to lose if they go to war. You develop a history with your opponents—they will not forget a betrayal, nor will they forget timely aid.

This last statement is not entirely true. The computer foes have a variety of personalities. Some are erratic, switching from best friend to deadly enemy on a whim. Others are honorable, xenophobic, calculating, and opportunistic. Espionage can give you some idea of the attitudes and goals of your opponents. Between personalities, opportunities, mistakes, and random events, the diplomatic landscape can become a constantly shifting kaleidoscope. That's entertainment!

The interface for Master of Orion is strongly intuitive. I had some trouble learning to use the production ratio bars, but the online tutorial helped me to figure things out rapidly. The sound and music are solid, but nothing exceptional. The game remained silent when I planned my turns, a fact I appreciated. Graphics are quite good, especially the art for the various races. There was minor animation only.

As a strategy game, Master of Orion is lively and imaginative. A variety of factors keep the game challenging. The interaction of personalities and diplomacy creates surprises. Numerous technical developments can radically alter the balance of power in a short time. The only problem I found was in the difficulty levels. The Hard and Impossible levels improve the opponents by letting them build a *lot* more than the human player. This failing is common to many strategy games and should not significantly detract from your enjoyment of Master of Orion. (Microprose Software, Inc., 180 Lakefront Dr., Hunt Valley, MD 21030. 410/771-1151) ■

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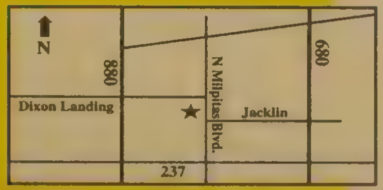

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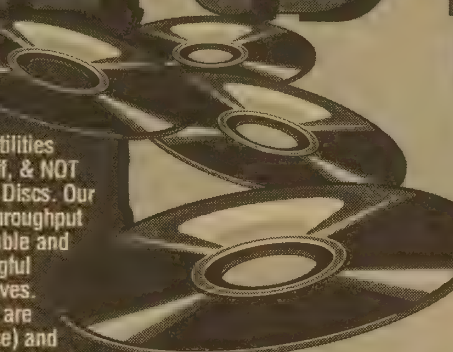

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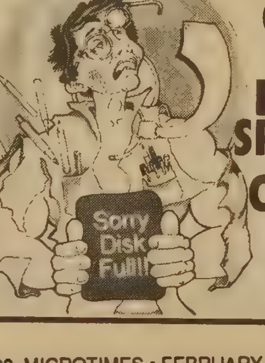

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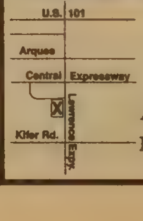

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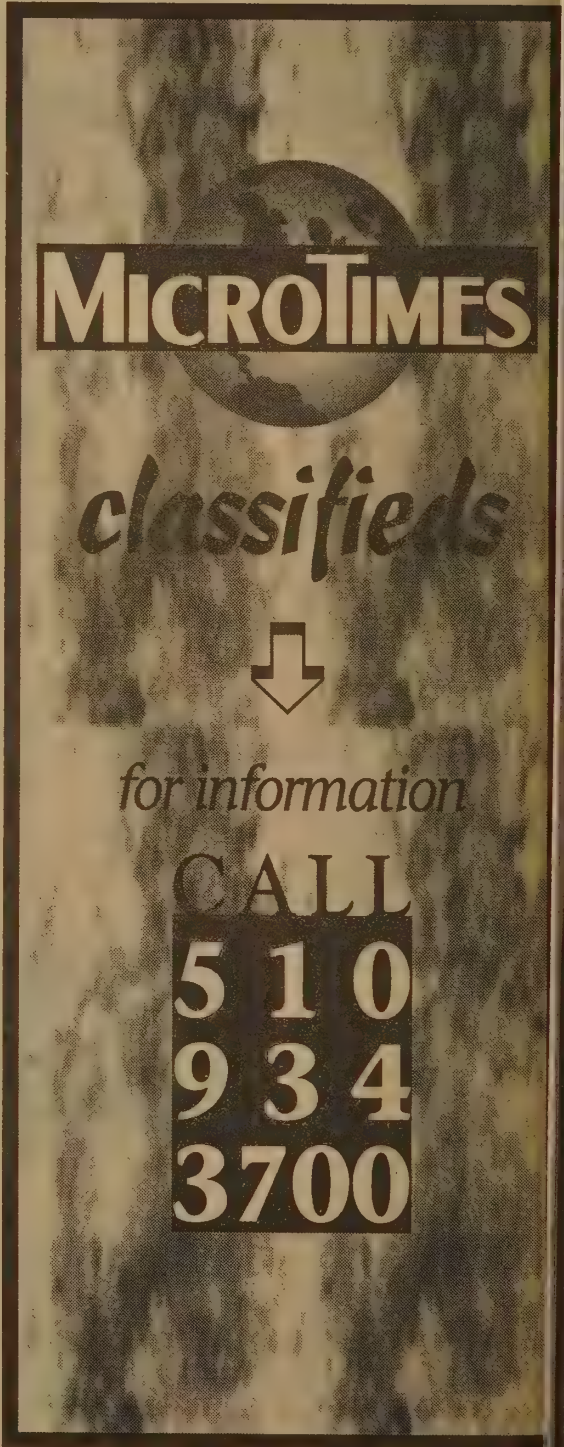

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DX-33	$1445
DX2-50	$1545
DX2-66	$1645

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- Microsoft serial mouse
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DX2-50	$2275
DX2-66	$2375

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- 32-Bit IDE disk controller
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- 32-bit Diamond Stealth 24 VLB 1MB RAM
- 32-bit Adaptec 2842VL Fast SCSI-2 contr.
- Deluxe Full-Tower Case 300W Dual Fans
- 101 Enhanced Keytronic Keyboard
- 3-VESA, 5-ISA Slots
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- Labtec 150 amplified speakers

KIT #3 PROFESSIONAL KIT $595
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- Pro Audio Studio 16
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KIT #4 ULTIMATE KIT $795
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- 32-bit Integrated Ethernet adapter
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- (Monitor not included)

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R4400 67/133MHz	*$4595*
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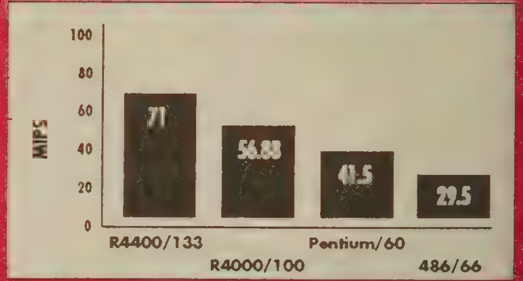
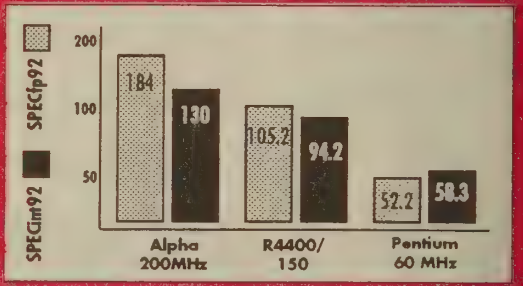
- 32-bit PCI local Bus Video adapter 2MB VRAM Upgradeable to 4MB 1280x1024 16.7M colors
- Deluxe Baby AT (Full-Tower) Case 250W
- 101 Enhanced Keyboard
- 2-PCI and 3-ISA slots
- Integrated 2S and 1P Ports
- 32-bit PCI Integrated Ethernet adapter
- Microsoft Windows NT with License
- Designed and Manufactured in the U.S.A.
- (Monitor not included)

DEC Alpha 166MHz	*$5395*
DEC Alpha 200MHz	*$6695*

MIPS R4400/150 vs. Pentium/60



Power Meter benchmarks under Windows NT



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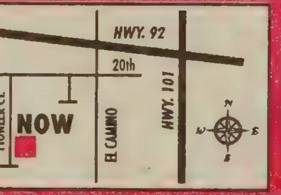

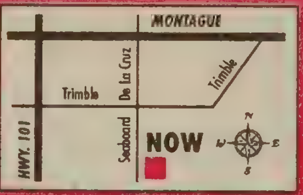

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- Should I buy ISA, EISA, VESA or PCI?
- What's the difference between DX2, DLC, SLC2...etc?
- Is the Pentium Processor running at 60MHz or it is also a clock doubler?
- Oh no! There are RISC systems to worry about now!
- Is the P24T OverDrive the same as the Pentium Processor?
- What the heck is a "Green PC", and do I need it?

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- 32-bit Promise Tech VLB IDE Controller
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- 1.2 and 1.44MB Floppy Drives
- 15" MAG MX15F LR NI Monitor
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- 1.2 and 1.44MB Floppy Drive
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- 32-bit BusLogic 445S VLB SCSI-2 Contr
- Deluxe Full-tower Case 300W 2 Fans
- 101 Enhanced Keytronic Keyboard
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- 32-bit Promise Tech VLB IDE Controller
- Green 230W PS
- Medium Tower Case
- 101 Enhanced Keyboard
- 3-VESA and 5-ISA Slots
- Pentium Overdrive ZIF Socket

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- 1.2 and 1.44MB Floppy Drives
- 15" ADI 4G MicroScan Flat NI Monitor
- 32-bit Stealth 24 VLB Video 1MB RAM
- 32-bit VLB Promise IDE Controller
- Medium Tower Case 230W PS
- 101 Enhanced Keyboard
- Toshiba SCSI-2 200ms CD-ROM
- Pro Audio Studio 16 Sound Card
- Labtec 550 amplified speakers
- DOS 6.2 and Windows 3.1
- Logitech Mouse
- 3-CD w/Encyclopedia

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- ISA/VESA Motherboard
- 256K write-back Cache
- 4MB 70ns RAM up to 64MB
- 210MB Western Digital IDE 12ms HD
- 1.2 and 1.44MB Floppy Drives
- 14" SVGA .28dp NI Monitor
- 32-bit VLB Video 1MB RAM
- 32-bit VLB IDE Controller
- Mini-Tower Case 200W PS
- 101 Enhanced Keyboard
- Panasonic 562 CD-ROM dbl speed
- Sound Blaster Pro DLX w/software
- Pair of Stereo Speakers
- DOS 6.2 and Windows 3.1
- Logitech Mouse
- 3-CD Titles

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OPTIONS & UPGRADES

MultiMedia Upgrades

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NEC CDR-3Xi	$469
Toshiba 3401B	$349
TEAC CD-50	$269
Panasonic 562	$189
SCSI Controller	*$49*

Sound Cards

SB Pro Dlx	$99
SB 16ASP MultiCD	$199
SB 16ASP SCSI-2	$219
PA Spectrum 16	$149
PA Studio 16	$189
Turtle Beach MultiSnd	$499

Speakers

Labtec 150/550	$22/29
Altec ACS 50/300	$79/299

Monitor/Video

NEC, Sony, Nanao, MAG, ViewSonic, ATi, Diamons, Matrox, Orchid...etc,............***Please Call***

Fax/Modem

96/24 Fax/Modem	$45
Zoltrix 14.4K F/M	$129
USR Sportster 14.4 F/M	$155
Intel Satisfaction 400	$289

Storage Devices

CMS DJ-20 250MB TBU	$149
Archive 525MB SCSI	$499
HP 2.0GB SCSI w/Kit	$1099
CMS PT-25 2.4GB TBU	$995
SyQuest 88MB C SCSI	$299
Iomega 21MB Floptical	$389

Pointing Devices

3-Button Mouse	$15
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Logitech TrackMan	$79
MS Mouse II	$39

Software

DOS 6.2	$42
Windows 3.1	$42

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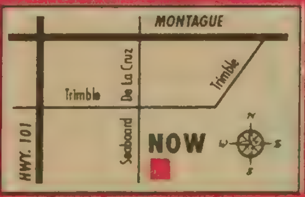

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USER GROUPS

Continued from page 264

ADOBE

Systems Adobe Technology Exchange. Meetings: 3rd Thurs., 6:30 pm, Ultradata Corp., 5020 Franklin Dr., Pleasanton. Call: (510)417-4185. [Exp. #122.]

AMIGA

AGA. Meetings: 7th of each month, downtown San Francisco. Graphics user group for 3-D/2-D, animators, multimedia, and videographers. Call: Ollie, (415)863-8792. [Exp. #123]

AUM—Amiga Users Of Marin. Meetings: 3rd Wed., 7:30 pm, College of Marin Science Center, Rm. 191, Kentfield. Desktop Video SIG, Rm. 192, 6:00 pm. Call: (415)479-6717. BBS: (415)485-5895. [Exp. #120.]

AWEST Amiga Users In SF. Meetings: 1st Thurs., 7:00 pm, Laguna Honda School, Conference Rm, 1350 7th Ave., San Francisco. Call: (415)584-8406; BBS: (415)824-8774. [Exp. #120.]

FAUG—First Amiga User Group. Meetings: 1st Tues., 7:30 pm, HT Electronics, 275 N. Matilda Ave., Sunnyvale. Q &A, new product demos, public domain software. Call: Mike Fisher, (415)855-9816; BBS: (415)341-7566; Usenet: mikef@vid.hp.com. [Exp. #122.]

Original Amiga User Group. Meetings: 2nd Wednesday Winner Circle Systems, 2618 Telegraph Ave., Berkeley. Call: Bob Krones (510)653-5689 [Exp. #119.]

RE—AMIGA Redwood Empire Amiga User Group. Meetings: 2nd Tues., 7:30 pm, Rohert Park Jr. HS, RM. C-5, 7165 Burton Ave., Rohnert Park. Call: (707)523-9978. BBS: (707)795-2717. [Exp. #120.]

APPLE

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs., 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. Beginners and advanced, question and answer, new product demos, public domain software. Call: (415)367-8657. [Exp. #123.]

TVAUG—Tri-Valley Apple II User Group. Meetings: 1st Wed., 7:00 pm, Glendale Federal Bank, 3101 Crow Canyon Rd., San Ramon. Software demonstrations, raffle, public domain software, question and answer session. Call: Jerry Carleton, (510)828-0959. [Exp. #120.]

AT&T

AT&T Computer Users Group. Meetings: 1st Wed., 7:00 pm, 50 Fremont St., 40th Floor—near 1st and Mission, San Francisco. Refreshments, technical support, and informal discussions. Also, Sunnyvale DOS and UNIX groups. Call: Jim Lansing, (415)885-6631. [Exp. #119.]

AT&T UNIX Users Group-South Bay. Meetings: 3rd Wed., 7:00 pm, PM new user education. Call: Thad Floryan, (415)961-5157 or USNET: thad.cup.portal.com. [Exp. #119.]

ATARI

Atari Unlimited. National networking and support. Write: PO Box 691, Mountain View, CA 94042. Call: Patti Barbiero, (415)903-9787. [Exp. #119.]

Bay Area Atari Users Group. Meetings: 1st Mon., 7:30 pm, Agnews Aud., 2nd fl., San Jose. Write: c/o 3691 Eastwood Cir., Santa Clara 95054. Call: Steven Lee, (408)988-3878. BBS: (408)986-0215. [Exp. #122.]

San Leandro Computer Club. Meetings: 1st Tues., 8:00 pm. San Leandro Public Library, 300 Estudillo Ave. 8/16/32-bit, SIGs. Call: Jim, (510)872-1244. [Exp. #122.]

STace—Atari Computer Enthusiasts. Meetings: 3rd Thurs., 7:30 pm. Pac Tel Bldg., 3260 Sebastopol Rd., Santa Rosa. Call: Kim Remick, (707)795-8173. [Exp. #120.]

CAD

Berkeley Macintosh CAD User Group. Meetings: last Tues., 7:00 pm, San Francisco Apple office, 10th Floor, One Bush Street, San Francisco. Call: Steve Lukrofka, (415)665-1776. [Exp. #120.]

Contra Costa AutoCAD User's Group. Meetings: 2nd Sat., 1:00 pm, 1333 Willow Pass Rd., Suite 203, Concord. All CAD users welcome. Call: (510)687-5666. [Exp. #120.]

Marin AutoCAD Users Group. Meetings: 1st Thurs., 6:30 pm, Eldeon Beck Associates, 171 Carlos Dr., San Rafael. Call: Gini Bollinger, (415)491-4722. [Exp. #120.]

Russian AutoCAD Users Of America. Meetings: 2nd Wed., 6:00 pm, Rosenberg School, 5133 Geary Blvd., San Francisco. Call: Michael Belilovsky, (415)387-7764. [Exp. #120.]

SF AutoCAD User Group. Meetings: 1st Mon. Call: Mark Williamson, (415)383-4060. [Exp. #120.]

Sonoma County AutoCAD Users Group. Meetings: 3rd Tues., Piner High School, Rm. H83, Santa Rosa. Call: Bud Schroeder, (707)987-3108. [Exp. #120.]

COMMODORE

C=HUG (Commodore Hayward User Group). Meetings: 2nd Sat., 2:00 pm, Palma Ceia Park. (510)531-3734. [Exp. #123.]

CWEST Commodore 64/128. Meetings: 2nd. Wed., 6:30–8:45 pm, Excelsior Library, 4400 Mission, San Francisco. San Francisco. Call: (415)626-9946. [Exp. #122.]

DESKTOP PUBLISHING

BMUG Desktop Publishing And Design Sig. Meetings: 3rd Tuesday, 6:30 pm, SF Police Academy, 350 Amber St., San Francisco. Call: Les Cowan, (415)641-6033. [Exp. #122.]

Ventura Publisher (& Corel Ventura) User Group (formerly San Mateo County VPUG). Meetings: 3rd Mon. (Sept.–May), 6:45 pm, 1800 Rollins Rd., Rm. 14, Burlingame. Call: Elinor Cruz, (415)366-5317. [Exp. #123.]

IBM AND COMPATIBLES

Berkeley PC User Group. Meetings: 2nd Tues., 7:00 pm, Winners Circle Systems, 2618 Telegraph Ave., Berkeley. No charge, newsletter $24/yr, free PD library, beginner SIG, GeoEnsemble SIG. Call: Mel Mann, (510)526-4033. [Exp. #119.]

EastBay FOG. Meetings: 2nd Wed., 6:30 pm, Episcopal Church of St. John-in-Montclair, 1707 Gouldin Rd., Montclair. All microcomputers, MS-DOS, CP/M. Call: (510)653-2627. [Exp. #123.]

Fremont PC User Group. Meeting dates vary. Fremont Central Library. Topics: latest in public domain CD-ROMS & how to install a CD-ROM drive. Call: (510)795-4286 ext. 7. BBS: (415)652-1736. [Exp. #120.]

Golden Gate Computer Society. Meetings: 4th Mon, 7:00 pm, San Rafael Community Center, 618 B St., San Rafael. Free intro to computers class at 6:00 pm. Call: (415)927-2909. [Exp. #121.]

Napa Valley PC Users Group. Meetings: 2nd Wednesday, 7:30 pm. For location and presentation topic, call: Lee Schwab (707)257-2675. [Exp. #123.]

Peninsula Computer Club. Meetings: 2nd Thurs., 7:00 pm, Social Room, 222 Laurel St., San Carlos. DOS and CP/M libraries. Call: Larry Welling, (415)593-9981. BBS (415)571-9259. [Exp. #120.]

San Francisco Business Computers. Meetings: 4th Tues., 5:30 pm. 110 Pacific #153, San Francisco. For those who use computers in business. Visitors $5. Call: Jordan Rosenberg, (415)788-5338. MCI mail: 425-1545. [Exp. #123.]

San Francisco Computer Society. Meetings: 4th Mon., 7:00 pm, Presbyterian Church, 1329 7th Ave., San Francisco. Call: Bob Forsberg, (415)885-6202. [Exp. #123.]

San Francisco PC Users Group. Meetings: 3rd Tues., 6:15 pm SIGs, 7:30 pm General Meeting. Fort Mason, Bldg. A. Call: (415)979-5879. [Exp. #122.]

South Bay WordPerfect User Group. Meetings: Monthly, dates vary. Saratoga Community Library. Free. Call: Scott Maiden, (408)253-4591. [Exp. #122.]

Stanford Palo Alto Area PC User Group. Meetings: Last Wed., 7:30 pm, Varian Aud., 3075 Hansen Wy., Palo Alto. Call: (415)329-8252. [Exp. #1223.]

Terminal Transfer User Group. For info, send S.A.S.E to Dave Blair, 2440 16th St., #171, San Francisco, 94103. Or call: (415)431-7621. [Exp. #123.]

LAPTOPS HPX HP

Laptops & Handhelds. Meetings: 2nd Sat., 10:30 am, Sunnyvale. Call: Michael Felsenstein, (415)564-8279. [Exp. #123.]

LEGAL

SF Bar Assoc. WordPerfect User Group. Meetings: 3rd Wed., odd-numbered months, noon, SF Bar Assoc. Boardroom, 7th fl., 685 Market St. Brown bag meetings. Call: (415)421-5650. [Exp. #123.]

MACINTOSH

A32 Macintosh User Group. Meetings: 2nd Sat., 10:00 am, Sunnyvale Community Center, 550 Remington Ave., Sunnyvale. Question and answer, guest speakers, disks-of-the-month, bimonthly newsletter, $35 annual dues. (408)263-0398. [Exp. #122.]

Diablo Valley Macintosh User Group (DVMUG). Meetings: 3rd Tues., 7:00 pm, Bancroft School, multipurpose room, 2200 Parish Dr., Walnut Creek. Get together w/Mac and Performa users. Enjoyable SIG meetings. Call: Connie, (510)827-5775. [Exp. #122.]

Gay Macintosh User Group. Meetings: 4th Mon., 7:00 pm, New Conservatory Theatre, 25 Van Ness, San Francisco. GMUG is a nonprofit group open to everyone. Call: (415)552-GMUG. [Exp. #119.]

International Macintosh Users Group (IMUG). Meetings: 3rd Thurs., 7:00 pm, Apple Computer, R&D Campus, 1 Infinite Loop, Cupertino. A forum for people using Macintosh computers in different languages. Call: Roger Sherman, (415)859-5146. [Exp. #123.]

Macintosh SIG. Meetings: 3rd Tues., 7:00 pm, Apple Cafeteria, City Center 4, De Anza and Rodrigues, Cupertino. Sponsored by Software Entrepreneurs' Forum. Call: Jeff Cherniss, (408)356-9901, or Barbara Cass (408)854-7219. [Exp. #123.]

PAUG—Peninsula Apple User Group. Meetings: 3rd Thurs, 7:00 pm, Ampex Cafeteria, 411 Broadway, Redwood City. Beginners and advanced, question and answer, new product demos, public domain software. Call: Roger Laker, (415)367-8657. [Exp. #123.]

SPC Apple User Group. Meetings: 2nd Tues., 7:30 pm, Fremont Main Public Library. The Society for Prevention of Cruelty to Apple Computers Users Group supports all Apple and Macintosh computers. Call: Dean Fearn, (510)881-9160. [Exp. #123.]

MARKETING

Marketing SIG. Meetings: 4th Thurs., 7:00 pm, Cubberley Community Center, Rm. H-1, 400 Middlefield Rd., Palo Alto. SIG of Software Entrepreneurs' Forum. Call: Bill Ryan, (415)615-7906. [Exp. #119.]

MULTIMEDIA

Design SIG. Meetings: 3rd Tues., 6:00 pm. For independent businesspeople in graphic arts and word processing. Topics related to running own business. Call: Bill Brent, (415)282-7368. [Exp. #120.]

Macromedia User Forum. Meetings: 1st Wed., 7:00 pm, 600 Townsend, at 7th St., San Francisco. Authoring, 3-D, content, and tools. Call: (415)252-2295. [Exp. #120.]

North Bay Multimedia Association (NBMA). Meetings: 3rd Thurs., 7:00 pm, Semantic, Novato. Call: Lee Callister, (415)883-0449. [Exp. #119.]

SEF Multimedia SIG. Meetings: 1st Thurs., 7:00 pm, Center for Software Development, 111 W. St. John Street, Suite 200, Downtown San Jose. SIG of Software Entrepreneurs' Forum. Call: Ralph Gilman, (408)746-0551. [Exp. #123.]

NETWORKING

NetSIG. Meetings: 4th Tues., 7:00 pm, Novell Sunnyvale. Networking SIG for Software Developers. SEF group. Call: Skip Addison, (408)283-3545. [Exp. #119.]

NOVELL

Silicon Valley Novell User Group. Meetings: 3rd Wed., 6:30 pm, Sundowner Inn, 504 Ross Drive. Call: Stephanie or Beth, (408)522-8690. BBS: (408)739-8753. [Exp. #122.]

OS/2

OS/2 Bay Area User Group. Meetings: 4th Mon., 7:00 pm. For anyone interested in OS/2. Presentations, product demos, questions and answers. Call: (415)755-3124. [Exp. #122.]

PARADOX

Bay Area Paradox User Group (bapals). Meetings: 4th Tues., except June and July, 4th Wed., 4:30 pm, McKesson Bldg., 1 Post St., 18th floor, San Francisco. Call: (415)995-4688. [Exp. #122.]

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- Teac 1.2MB 5.25" Floppy Drive
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- Focus or Maxiswitch 101-Key Enhanced Keyboard
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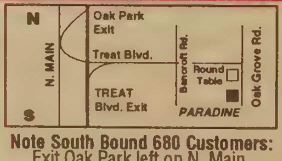

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Viewsonic 15	15" 1280x1024	.28	NI	$475
Viewsonic 7	17" 1280x1024	.28	NI	$849
Viewsonic 17	17" 1600x1280	.28	NI	$1,045
Viewsonic 20	20" 1600x1280	.28	NI	$1,749
Viewsonic 21	21" 1600x1280	.26	NI	$1,969

HITACHI (NSA)

CM2095	20" 1280X1024	.28	NI	$1,355
CM2187	21" 1600X1280	.31	NI	$1,955
CM2187-515	21" 1600X1280	.28	NI	$2,175

SONY

CPD-1430	14" 1024x768	.25	NI	$615
GDM-17SE	17" 1280x1024	.26	NI	$1,225
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F550iw	17" 1280x1024	.28	NI	$1,185

Miscellaneous

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Diamond Speedstar/Pro	ISA 16-Bit	1MB	$139
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486 BL3-75 VLB	$725

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SQ3105A	105MB	20ms	IDE	Int	$389

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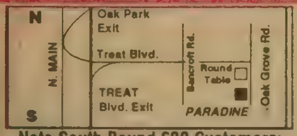

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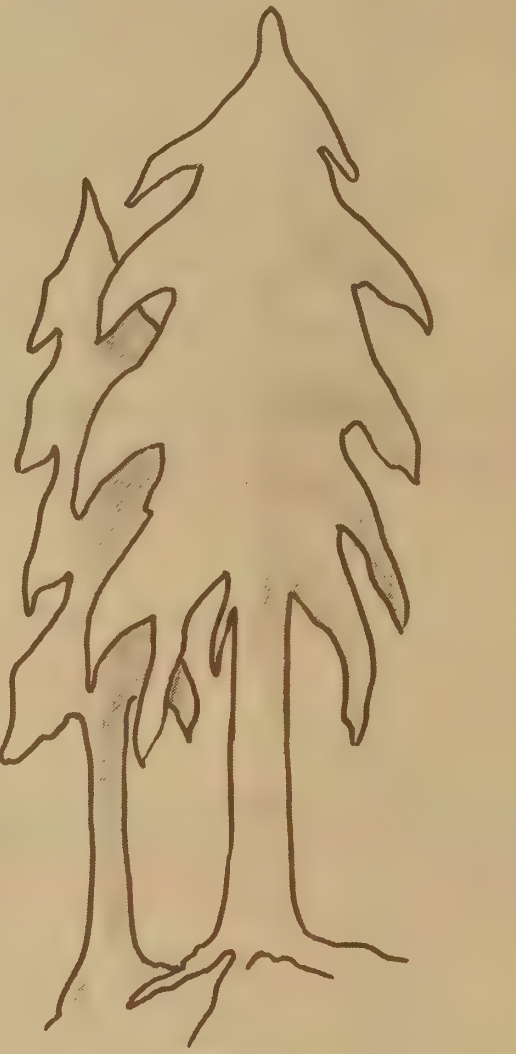

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USER GROUPS continued...

PEN COMPUTING

Pen Software SIG. Meetings: 4th Wed., 7:00 pm, Cubberley Community Center, Rm. H-1, 400 Middlefield Rd., Palo Alto. SIG of Software Entrepreneurs' Forum. Call: Bill McAlpine, (415)348-2257. [Exp. #119.]

PROGRAMMING LANGUAGES

North Bay Forth Interest Group. Meetings: 2nd Sat., 1:00 pm, 2055 Center St., Berkeley. Tutorial at noon. Call: Leonard Morgenstern, (510)376-5241. [Exp. #122.]

SEF Visual Basic SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Comm. Ctr., Rm. H-1, 4000 Middlefield, Palo Alto. Call: Allan Colby, (415)851-4657. [Exp. #122.]

Silicon Valley Forth Interest Group. Meetings: 4th Sat., 10:00–5:00 pm, Applied Biosystems, Inc., Conference Room A/B, 230 Lincoln Centre Dr., Foster City. Call: C.H. Ting, (415)571-7639. [Exp. #122.]

Visual BASIC SIG. Meetings: 2nd Thurs., 7:00 pm, Cubberley Community Center, 4000 Middlefield Rd., Rm. H-1, Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: Allan Colby, (415)851-4567. [Exp. #119.]

Visual C++ Bay Area Developer's Group. Meetings: 3rd Wed., 6:00 pm, Berkeley. For agends, location, and RSVP, Call: (510)254-9700, ext. 490. [Exp. #123.]

TEXAS INSTRUMENTS

TI-99/4A. Meetings: 2nd Sat., Oakland. Call: Fred, (510)530-8335. [Exp. #122.]

UNIX/XENIX

N. California UNIX SIG. Meetings: dates vary. UNIX, XENIX, LINUX, Coherent. Beginners welcome. Call: Randy Just, (707)769-1648. BBS: (707)754-1431. Email: rjust@justcomp.com. [Exp. #120.]

UNIX SIG. Meetings: 2nd Tues., DEC Aud., 130 Lytton Ave., Palo Alto. Sponsored by Software Entrepreneurs' Forum. Call: (415)546-4950. [Exp. #119.]

VIDEO TOASTER

Video Toaster User Group. Meetings: Last Thurs., 7:30 pm, HT Electronics, 275 N. Mathilda Ave., Sunnyvale. Special guests, equipment demos, hands-on workshops, plus info/tips on new System 3.0. Call: Andrew Timmins, (408)243-9233 (eve). [Exp. #120]

WINDOWS

BAWOW—Bay Area "Windows on Wall Street" User Group. For people interested in actively following the stock market using this revolutionary new software. Call: Dave Ittner, (510)796-4528. [Exp. #122.]

Windows SIG South. Meetings: 1st Wed., 6:30 pm, Cubberley Community Center, Room H-1, 4000 Middlefield Rd., Palo Alto. Software Entrepreneurs' Forum. $10 for nonmembers. Call: Barbara Cass, (415)854-7219. [Exp. #123.]

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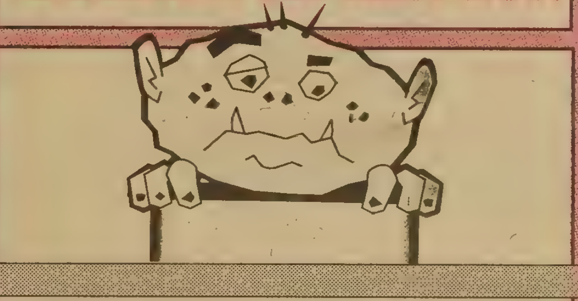

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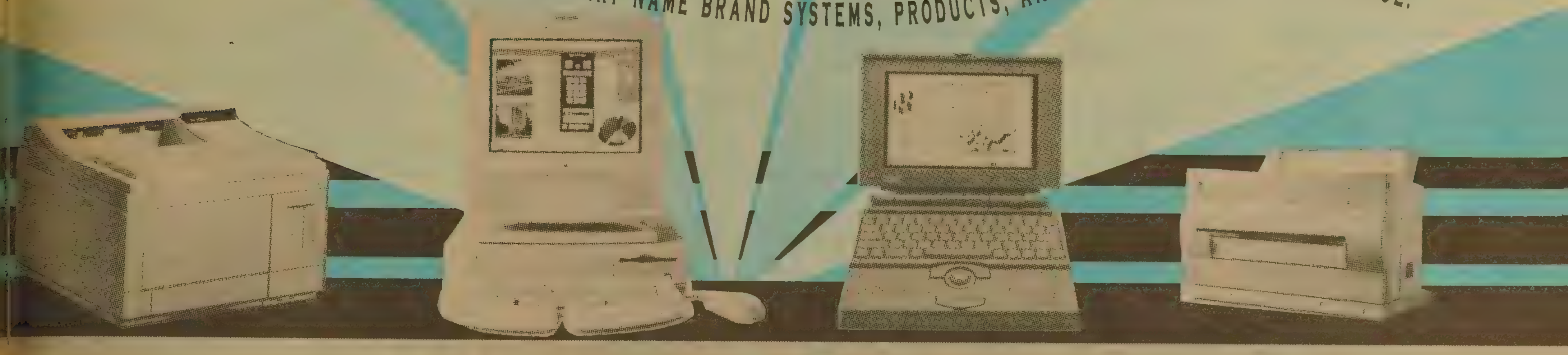

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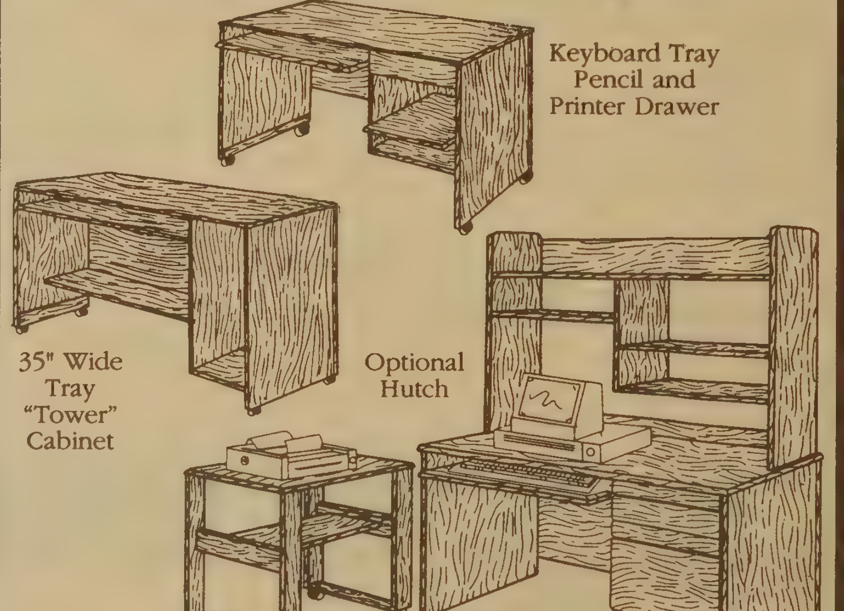

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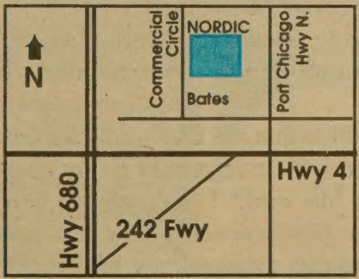

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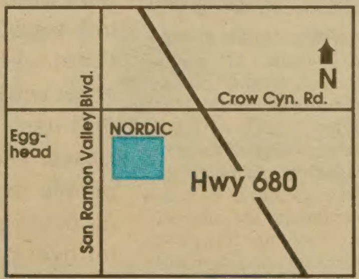

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or

A Convention Town, It Ain't

BY JOHN C. DVORAK

DVORAK'S LAST COLUMN

Can there be a worse town for having Macworld Expo than San Francisco? Nope, no way. January's Macworld showed once and for all that San Francisco is ill-equipped to have a convention or show if more than ten thousand people attend. I'm not even sure the town won't bust at the seams at ten thousand. Cut loose fifty or sixty thousand and all hell breaks loose.

Ever since the ridiculous expansion of Moscone center—which can now be called the worst show site in America—it's painfully obvious that City Hall is more interested in parking tickets than hospitality. Parking ticket revenue has become a profit center in San Francisco, and the mess around Moscone indicates to me that San Francisco doesn't care one iota about anything but parking ticket revenue. Either that or the city is run by boneheaded idiots.

GRIDLOCK: THE MESS CONTINUES

Let's look at the Macworld mess. Gridlock for ten square blocks around Moscone. The first thing the city does is ban parking at the metered parking spaces behind Moscone. Why? To help the flow of traffic? No, that can't be it, since a construction fence near the end of the street completely blocks the lane freed up by the parking ban. Is parking banned in these spots because there is construction going on? Nope, except for the fence, there is nothing going on. It's simply banned to lure suckers into parking there so they can get tickets. It also makes fewer legal parking spots available, forcing people to park illegally.

Example: The old US Mint building is surrounded by No Parking signs and people were forced to park there. All the alleys were filled with illegal parkers. The few pay lots were filled early, and at least two of them were hindered by some dubious street work that prevented them from maximal use. The Moscone parking lot was closed. The sign said Full, and even though people were leaving by droves there were no new people being allowed in. The large lot over by the Examiner building, which can normally have two entrances open, had one blocked off so that a line of cars went from Mission to the freeway exit. It was a joke. It took me one half hour to go one city block.

Historically, big shows used both Moscone and Brooks Hall/Civic Auditorium across town. This helped spread out the showgoers and the parking. You'd take the shuttle between one part of the event and the other.

This was not working for the city of San Francisco. They could not get enough people to park illegally with this situation. The best idea was to rip out the parking lots at Moscone (yes, there were parking lots) and double the capacity of the place. Since the roadways were not modified to handle the traffic, it would form a gridlock around the convention center. If there was a ten-story-high parking lot at Moscone it would take you hours to get to it. Everything surrounding the convention center is new enough that it won't get torn down anytime soon to improve this situation.

To make sure that the gridlock inconveniences the entire city (this is so the cretins in City Hall can have something to chuckle about at night) no police were enforcing the intersection blocking laws. In San Francisco you can't drive into an intersection on a green light if the intersection isn't clear—this causes gridlock. I drove around all the intersections surrounding Moscone and found no police writing tickets for these ongoing violations. Instead I saw meter maid trucks positioned at each intersection—poised to nail parking and meter violations. Priorities, priorities. Ask any Muni driver who had to drive through this mess for a confirmation of this observation.

BUT WAIT, THERE'S MORE

But that law, which desperately needed enforcing during the Macworld fiasco, was only one of the many laws not being enforced. Have you ever heard of vagrancy and loitering laws? San Francisco has them, but chooses to selectively ignore them, so the Convention Center is surrounded by beggars.

It's incredible that the City would let this out-of-control situation prevail at a national show like Macworld. I can't tell you how many people from places like New York and Chicago and Cleveland tell me how much worse the vagrant problem is in San Francisco than it is anywhere else in the country. Self-proclaimed homeless aggressively demand money from you on almost every corner of every street. They surrounded Moscone. Of course a few blocks away it's even worse.

A lot of showgoers were forced to park in the worst part of town. Let's call it 6th and Howard. It's amazing how San Francisco can put a showpiece like Moscone right in the middle of the worst part of town, but they did.

Anyway, I see two out-of-town yuppies (late 30s is my guess) standing on the corner of 6th and Howard. Obviously they parked off in the crummy part of town (which, as we know, is substantial). They are being followed by some poor raggedy-clad soul, his hand outstretched, a tattered coat sleeve dangling in the breeze. Across the street three or four others see this shrink-wrap couple and move in on them. The twosome are walking towards Moscone and in their path are five more beggars, one holding a cup, another a grimy Giants cap, the others standing and waiting their turn.

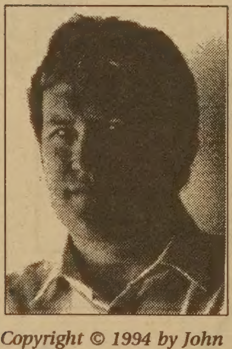
The couple look around. Anguish and fright cover their faces as these people move in. I swear it looked like a scene from the *Night of the Living Dead.* I couldn't help but laugh as he held her close as they looked all around for some escape route "Welcome to San Francisco!"

I'm sure the city fathers (and mothers will laugh over this kind of event, which must have been repeated hundreds o times over the course of the show.

The fact is this town is the worst for any such conference. Putting up tents in Can dlestick Park would make for a better event And I don't want to hear any nonsens about public transportation. The buse were not getting through this mess. Takin a cab was hopeless. If you weren't staying a the Marriott or the ANA you'd have to wal a long way from a cab dropoff point to ge to Moscone.

It's a joke. Anyone putting on any kind o show would be ill-advised to use these facil ities. It's almost easier for people from th Bay Area to *fly* to Las Vegas and go to th convention center there than it is to get t Moscone. Incredible, but true.

Please, oh please don't do the Macworl Expo in San Francisco again! ■



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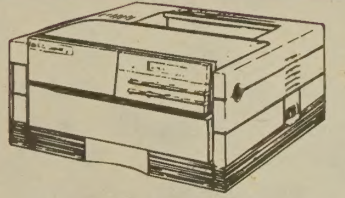

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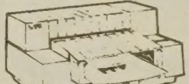

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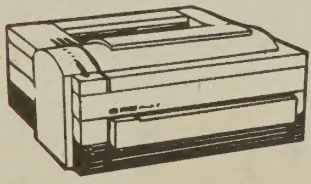

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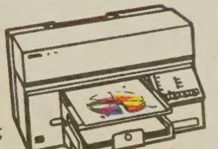

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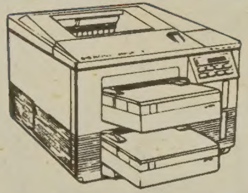

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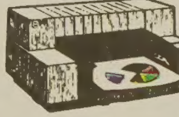

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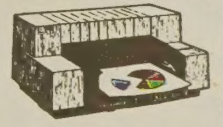

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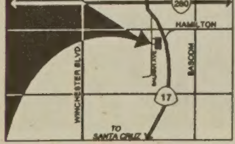

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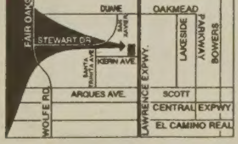

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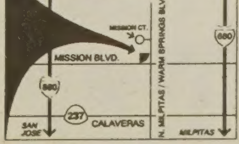

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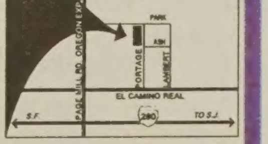

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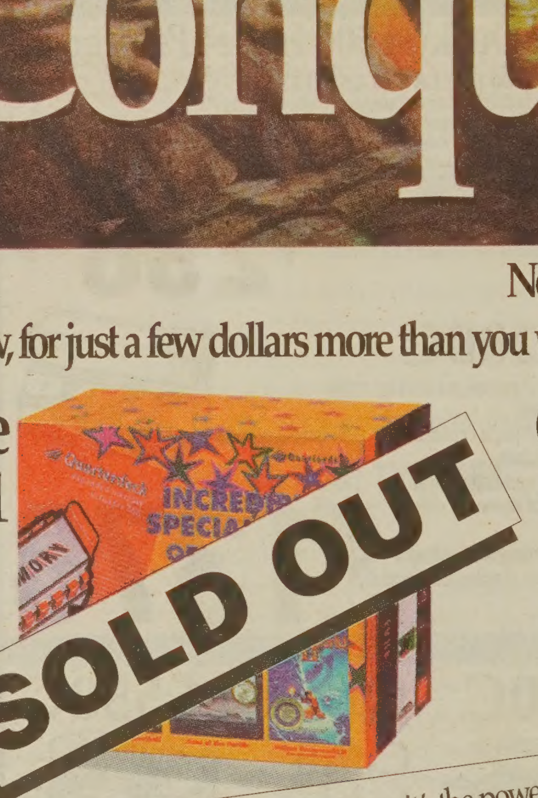

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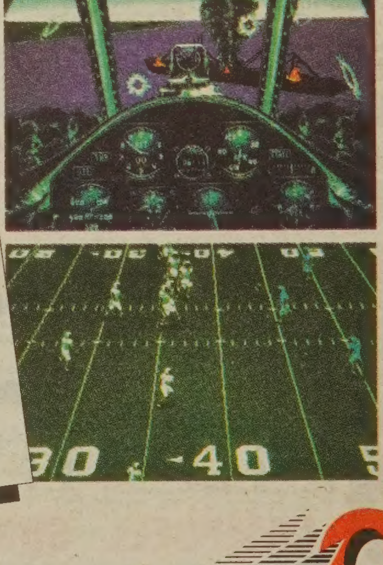

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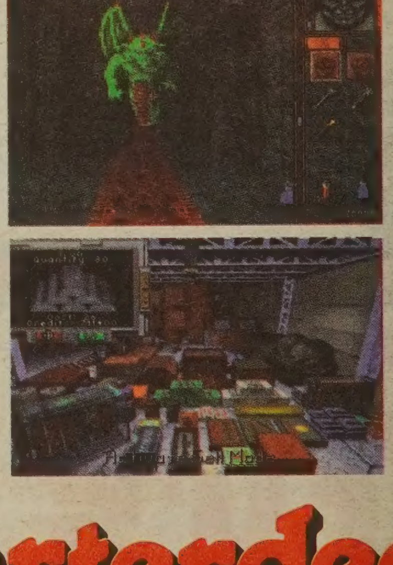

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